SELF-EFFICACY

AND

WEIGHT LOSS

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ABSTRACT

In this study the construct of self-efficacy was applied to weight loss. Firstly, a questionnaire relating to self-efficacy and weight was constructed and this was administered to overweight women who wanted to lose weight, successful weight watchers and a student population. The major part of the study concerned the treatment group, overweight women who wanted to lose weight (n=12) whose self-efficacy and weight loss were monitored at pretest, for the duration of treatment (two months), and follow-up (three months).

Results showed that the populations tested were differentiated by their self-efficacy scores. Although some studies of self-efficacy have used Rotter's Locus of Control as a measure of self-efficacy, the present study found these two constructs to be unrelated. A discriminant analysis dividing self-efficacy into components of temptation and confidence, assessing scores on an items level, was useful in discerning differences between groups and in identifying high risk situations for those in treatment.

Although numerous studies have attested to the predictive ability of self-efficacy scores, this was not supported by the present results, although sample size is considered a confounding variable. The hypothesis that increases in self-efficacy correspond to weight loss and decreases in self-efficacy to weight gain was supported by this investigation. Additionally, there is a suggestive trend that the components of temptation and confidence create a balance that appears to be individual that results in weight loss. Implications for future research are discussed.

LITERATURE REVIEW

SELF-EFFICACY

1. Theory

(i) Social Learning Theory

Bandura's emphasis within social learning theory is cognitive, thus persons are stressed over environment. Bandura's theory regards the person's internal mental state as the locus of important processes mediating observable behaviour. Reinforcement in Bandura's view has its effects on the individuals expectations rather than on responses after they are made. Following from these notions, Bandura postulates a self-system involving a cluster of active cognitive processes which are continually regulated by the environment and in turn, the self-system continuously modifies the environment that relates it. Thus, people have some degree of control over their behaviour.

Self-regulation of behaviour belongs to three major classes of self-system process. Firstly, there is self-observation of one's own performance quality and each person sets their own standard by which this is judged. Secondly, there are judgemental processes whereby each individual selects and applies some standard of 'goodness'. Thirdly, there is self-response or the application of reward and punishment to ones own performance in the light of a personal judgement of having matched or failed to match the selected standard. A positive judgement results in feelings of competence while negative judgements are self-devaluating. Bandura conceives the relationship between the self-system and the world as being interdependent, that is, reciprocal determinism.

Bandura has reconceptualized reinforcement in motivational terms that stem from a persons capacity to monitor his/her own behaviour. The individual is controlled by reinforcements to the degree s/he is aware of them, values their significance in his/her life and anticipates their

eventual application to him/herself (Monte, 1980). Thus, the social learning theory of causality in which the efficacy subpostulate is imbedded deals with "multiple determinants operating as reaprocally interlocking factors in the acquisition and regulation of behaviour" (Bandura, 1978, p237). Self-efficacy is regarded as influential, though obviously not the sole determinant of behaviour.

(ii) The Construct of Self-Efficacy

It is necessary to look more precisely at what Bandura means by the term self-efficacy. Bandura distinguishes between the persons outcome expectations and his/her efficacy expectation; "an outcome expectation is defined as a person's estimate that a given behaviour will lead to certain outcomes. An efficacy expectation is the conviction that one can successfully execute the behaviour required to produce the outcomes" (Bandura, 1977b, p193). In addition to differing from outcome expectancies, efficacy expectancies also differ from generalized construct such as Rotter's (1966) locus of control. Rotter (1966) proposed that behaviour varies as a function of generalized expectancies that outcomes are determined by one's actions or by external forces beyond one's control. Bandura comments that the notion of locus of control is often treated in the literature as analogous to self-efficacy. According to Bandura, Rotter's (1966) conceptual scheme is primarily concerned with causal beliefs about action-outcome contingencies rather than with personal efficacy. Perceived self-efficacy and beliefs about the locus of causality must be distinguished because convictions that outcomes are determined by one's own actions can have any number of effects on self-efficacy and behaviour. For example, people who regard outcomes as personally determined but who lack the requisite skills would experience low self-efficacy and view activities with a sense of futility. While causal beliefs and self-efficacy refer to different phenomena, causal ascriptions of behaviour to skill or to chance can mediate the effects of performance attain-

ments on self-efficacy (Bandura, 1977b). Bandura goes on to state that given appropriate skills and incentives, efficacy expectations are a major determinant of people's choice of activities, whether coping behaviour will be indicated, how much effort will be expended and of how long they will sustain effort in dealing with stressful situations (Bandura, 1977b).

(iii) Sources of Information

Expectations of personal efficacy are derived from four principal sources of information. Firstly, performance accomplishments are the most influential source of efficacy expectations. The individuals own history of success and failure situations structure, to a large degree, his/her anticipation of future successes and failures. Secondly, vicarious experience which involves observing others in terms of their success or failure at tasks. Thirdly, verbal persuasion which includes associated types of of social influence that one possesses certain capabilities. Lastly is emotional arousal in which people rely partly on their state of physiological arousal in judging their capability, strength and vulnerability in relation to stress (Bandura, 1977b, 1982; Monte, 1980). The more dependable the experiental sources, the greater are the changes in perceived self-efficacy. The impact of information on efficacy expectations will depend on how it is cognitively appraised. The cognitive processing of efficacy information concerns the types of cues people have learned to use as indicators of personal efficacy and the inferences rules they employ for integrating efficacy information from different sources (Bandura, 1977b, 1982).

Cognitive processes mediate change, but cognitive events are induced and altered most readily by experience of mastery arising from effective performance. In addition, behaviour is controlled not by its immediate consequences, but is related to its outcome at the level of aggregate consequences, rather than momentary effects (Bandura, 1977b). The more

varied the circumstances in which threats are mastered independently, the more likely are success experiences to affirm personal efficacy and to impede formation of discriminations, thus insulating self-perceptions from negative influence. Bandura notes studies that support the idea that generalized, lasting changes in self-efficacy and behaviour can best be achieved by participant methods using induction procedures initially to develop capabilities, then removing external aids to verify personal efficacy, then finally using self-directed mastery to strengthen and generalize expectations of personal efficacy (Bandura, 1977b). The impact of performance accomplishments on perceived self-efficacy may be influenced by ascription of achievement to personal competence or situational factors, whether one's accomplishments are ascribed mainly to ability or to effort, cognitive appraisals of the difficulty level of the tasks, the rate and pattern of attainments. People who experience setbacks but detect relative progress will raise their perceived efficacy more than those who succeed but see their performance leveling off.(Bandura, 1977b, 1982).

Independent performance can enhance efficacy expectations in several ways. Firstly it creates additional exposure to former threats. Reduced emotional arousal confirms increased coping capabilities. Secondly, it gives the opportunity to perfect coping skills which lessen personal vulnerability to stress. Thirdly, it provides success experiences which further reinforce expectations of self competency. This sourse of efficacy information also serves to reduce susceptability to relearning of defensive patterns of behaviour.

Vicarious experience can affect self-efficacy firstly, through the models characteristics, for example, perserverance; secondly, by the degree of similarity between models and observers; thirdly, through the difficulty of performance tasks, fourthly, by the situational arrangements under which the models achievements occur and lastly by the diversity of modeled attainments. The impact of verbal persuasion on self-efficacy may vary substant-

ially depending on (a) the perceived credibility of persuaders; (b) the prestige of persuaders; (c) their trustworthiness; (d) their expertise; and (e) their assuredness.

People judge their physiological arousal largely on the basis of their appraisal of the instigating conditions. If they believe their arousal stems from personal inadequacies they are more likely to lower their efficacy expectations than those who attribute their arousal to certain situational factors (Bandura, 1977b). People who judge themselves ineffectual in coping with environmental demands tend to generate high emotional arousal, become excessively preoccupied with personal deficiencies and cognize potential difficulties as more foridable than they really are. Such self referent concerns tend to undermine effective use of the competencies people possess and relapse of self-regulatory behaviour may occur. Meichenbaum (1977) and others (Beck, 1976, Mahoney, 1974; Sarason, 1978) have given considerable attention to the performance debilitating effects of negative self referent thoughts (Bandura, 1978). Accurate appraisals of ones own capabilities are of considerable value in successful functioning. Misjudgements of efficacy in either direction has consequences. Overestimates may lead to needless distress and failures. Underestimates are more likely to take self-limiting rather than aversive forms. Such individuals typically avoid beneficial environments and activities that would expand their competencies (Bandura, 1980, 1982).

(iv) Microanalytic Procedures

The functional relation between thought and action can be established most clearly through the use of microanalytic procedures. This approach involves detailed assessment of cogntive events in close proximity to the behaviour they supposedly regulate at the level of specific tasks. Specific proximal thought probes permit precise analysis of covariation between thought and behaviour (Bandura, 1978, 1982). An adequate expectancy

analysis requires detailed assessment of the magnitude, generality and strength of efficacy expectations. Bandura and Adams (1977) state the critical dimensions necessary to generalize the concept of self-efficacy. Firstly, the magnitude of the expectation, defined as the expectation across tasks or situaitonal difficulty. Secondly is the generality of the expectation, which concerns how circumscribed the sense of mastery or efficacy is with regard to a particular set of behaviours. Thirdly is the strength of the expectation or how easily the expectancies can be extinguished (Bandura & Adams, 1977). Both efficacy expectations and performance should be assessed at significant junctures in the change process to clarify their reciprocal effects on each other. Mastery expectations influence performance and are, in turn, altered by the cummulative effects of one's efforts (Bandura, 1977b).

Of central interest to self-efficacy theory is the dynamic interplay among self referent thought, action and affect. In this approach, self-referent thought is indexed in terms of particularized self-percepts of efficacy that can vary across activities and situational circumstances rather than as a global disposition. Measures of self-percepts are tailored to the domain of psychological functioning being explored (Bandura, 1982).

Studies using microanalytic procedures demonstrate that antecedent cognitions are excellent predictors of observational learning (Bandura & Jeffery, 1973; Bandura et al. 1974a), of operant conditioning (Brewer, 1974; Dulany, 1968), of classical conditioning (Dawson & Funedy, 1976; Grings, 1973), of conceptual learning (Phillips & Levine, 1975), of persistence on achievement tasks (Brown & Inouye, 1978; Schunk, 1978), and of behavioural change accompanying diverse modes of treatment (Bandura & Adams, 1977; Bandura et al, 1977). The best measure of behaviour is behaviour, not reports about it. Thus, in studying the relationship between perceived efficacy and action one should relate efficacy judgements to actual perform-

ance rather than to verbal reports that one had performed the relevant tasks. The available evidence from studies using microanalytic procedures indicates that performance is closely related to self-judged capabilities. If judgements and actions separated widely in time diverge, one is left with the unresolved issue of whether self-efficacy doesn't influence behaviour, or whether self-efficacy was altered by new experience during the intervening period (Bandura, 1978).

(v) Self-Efficacy as a Unifying Concept

Bandura (1982) notes that because people are influenced more by how they read their performance successes than by the successes per se, perceived self-efficacy is a better predictor of subsequent behaviour than is performance attainment. The finding that self-percepts of efficacy often surpass final performance as predictors of future performance receives support from other studies concerned with markedly different activities (Bandura & Adams, 1977; Di Clemente, 1981).

The theory systematizes a variety of findings. It predicts accurately the magnitude and generality of behavioural change for efficacy expectations induced enactively and vicariously. It orders variations in the level of behavioural change occurring within the same treatment condition. The predictive superiority of efficacy expectations over past performance is significant. These differential findings indicate that experienced mastery altered subjects sense of personal efficacy rather than merely providing behavioural cues for judgement of self-efficacy. Bandura (1977b) concludes that the present theoretical formulation orders variations in the level of behavioural changes produced by different modes of treatment, that it accounts for behavioural variations displayed by individuals receiving the same type of treatment and it predicts performance successes at the level of individual tasks. The theory posits a central processor of efficacy information. People process, weigh and integrate diverse sources of information concerning their

capability and they regulate their choice behaviour and effort expenditure accordingly. People seem to develop different efficacy expectations from similar experiences. One possible explanation for the variance is in terms of differential cognitive processing of efficacy information. A second possibility concerns the multiple determination of self-efficacy. Because people have met with different types and amounts of efficacy-altering experience, providing one new source of efficacy information would not be expected to affect everyone uniformly. Self-efficacy theory states that psychological procedures whatever their form, alter the level and strength of self-efficacy.

(vi) Self-efficacy and control

Choices during formative periods shape life paths through selective development of competencies, interests and affiliative preferences. A sense of controlability can be achieved either behaviourally or cognitively. In behavioural control individuals take actions that forestall or modify aversive events. In cognitive control, people believe they can manage environmental threats should they arise. These two forms of controlability are distinguished because many competent people are plagued by a sense of inefficacy and many less competent ones remain unperturbed by impending threats because they are self-assured of their coping capabilities. Ability to exercise behavioural control over potentially aversive events eliminates or decreases autonomic reactions to them. Often it is the self-knowledge of coping efficacy rather than its application that reduces anxiety arousal. Self-percepts of efficacy predict avoidance behaviour, whereas autonomic arousal bears no uniform relationship to it. Thus, people are more likely to act on their self-percepts of efficacy than on visual cues (Bandura, 1982).

Inability to influence events and social conditions that significantly affect one's life can give rise to feelings of futility and despondency as well as to anxiety. Self-efficacy theory distinguishes between two different

expectancy sources of futility. People can give up trying because they seriously doubt that they can do what is required. Or they may be assured of their capabilities but give up trying because they expect their efforts to produce no results due to the unresponsiveness, negative bias or punitiveness of the environment (Bandura, 1982). These two separate sources of futility have quite different causes and remedial implications. To change efficacy based futility requires development of competencies and a sense of personal effectiveness. In contrast, to change outcome-based futility necessitates changing the social environment so that people are rewarded for using competencies they already possess. There is a shift of focus from beliefs that one's performances will go unrewarde to beliefs that one cannot produce the performances. Social learning theory hypothesizes that those of low efficacy will give up readily should their efforts fail to produce results, but efficacious individuals will intensify their efforts and if necessary they will seek to change environmental contingencies. Experiences may foster disinterest or depression (if not reinforced) depending on whether the person invests their self esteem and sense of self-worth. It is attributions of the causes of outcomes to personal inefficacy that is most likely to undermine performance and the cause despondency (Bandura, 1978). In addition, the pattern in which people perceive themselves as ineffectual but see others who are similar enjoying the benefits of successful effort, may give rise to self-disparagement and depression. Evident successes of others make it hard to avoid self-criticism. Situational factors that often accompany poor performance can in themselves instill a sense of incompetence that is unwarrented. The mere presence of a highly confident individual undermines effective use of routine skills (Bandura, 1982).

(vii) Self-efficacy and interest

Bandura (1982) comments that several lines of research confirm that positive incentives promote interest when they enhance or authenticate

personal efficacy. People maintain or increase their interest in activities when rewarded for performance attainments, whereas their interest declines when they are rewarded for undertaking activities irrespective of how well they perform (Boggiano & Ruble, 1979; Cross, 1976). The larger the extrinsic reward for performances signifying conpetence the greater the increase in the activity (Enzle & Ross, 1978). Even incentives for undertaking a task, rather than for performance mastery can raise interest if engagement in the activity provides information about personal competence (Arnold, 1976).

In additon, Bandura (1982) notes the effects of proximal self-motivation. By making self-satisfaction conditional on a certain level of performance mastery, people create self-incentives for their own efforts. Self-motivation is best invoked and sustained by adopting attributable subgoals that lead to large future ones. Proximal subgoals provide immediate incentives and guides for action and proide clear indicators of progress along the way to verify a growing sense of self-efficacy. The satisfactions derived from subgoal attainments can build intrinsic interest and provide self-knowledge of capabilities. Two theories are proposed as alternatives to explain interest. The temporal lag theory proposes that increased interest emerges later rather than as an instant consequence of improved-self-efficacy. The threshold theory notes that it may require at least moderately high self-efficacy to generate and sustain interest in an activity, but interest is not much affected by small variations above or below the threshold level.

(viii) Summary

Bandura postulates that the concept of self-efficacy provides a means of predicting subsequent behaviours that is superior to past performance. Based on his studies, Bandura concludes that self-efficacy unifies a number of different findings regarding behaviour change. Efficacy information is processed, weighed and integrated by the individual and is used to regulate behaviour in terms of choice of activities and energy expenditure. Poser

(1978) comments that personal efficacy is a highly situation-specific expectancy that doesn't operate independently of contextual factors and their cognitive processes. He notes that Bandura has shown that the degree of personal efficacy can be varied systematically by manipulation of the environment. As a concept self-efficacy is inferred not only from what subjects say about their expected future performance in a given situation, but also from the congruence of that verbal report with subsequent performance. Poser concludes, however, that as yet it seems inappropriate to claim that psychological procedures, whatever their form, alter the level and strength of self-efficacy.

2. Criticisms

A number of criticisms have been directed at Bandura's theory of self-efficacy. Smedslund (1978) proposes the view that all valid theories of psychology are explications of common sense. Thus, because such propositions are compelling self-evident and logically necessary, there is little value to theoretically oriented research in psychology. By common sense, Smedslund means a network of concepts embedded in a language. The sentences that may be formulated describing conceptual relationships in this network are not empirically testable. They refer to a system of categories and relations that order empirical content. Hence, common sense formulations are not based on regularities of experience but are anterior to and determine such regularities. Smedslund says that consistently and throughout Bandura's article, Bandura interprets common sense as having empirical content and hence as capable of being factually wrong. Smedslund believes that some psychological theories are plausible and durable precisely because they express formal truths and hence cannot be empirically falsified. Smedslund believes that it is impossible to have a generally valid opinion that belief and behaviour are not logically independent and hence don't permit alternative possibilities.

In Bandura's (1978) opinion, Smedslund tranposes propositions concerning self-efficacy into colloquial terms. Smedslund then proves the logical implicatons of the propositions and shows that other propositions concerning primary theroiums. Bandura comments that it is a reasonable empirical proposition that the more strongly people believe that a certain action on their part will realize a desired outcome, the more likely they are to perform that act. It requires for its confirmation, some independent way of measuring strength of belief. Bandura is of the view that although logical analysis may provide a means of eliminating erroneous reasoning, it is not sufficient to establish factual accuracy. Bandura comments that informed observation and common sense notions don't always provide the correct direction for theorizing and experimentation. Many advances in knowledge have resulted from questioning the validity of propositions that are widely held to be self-evident. Bandura comments that one can have logical relationships between propositions that are contrary to observable fact. He continues that one must distinguish logical analysis of the internal structure of a theory from empirical analysis of the adequacy of a theory to predcit the events with which it deals. Different theories generate different empirically testable consequences. One decides between alternative conceptions by deducing testable consequences and determining how well the theories stand up under systematic observation.

Eysenck (1978) examines the conceptual and methodological issues raised by self-efficacy theory. The conceptual issues include the interrelationships of self-efficacy and other constructs such as competence, incentive and cognitive appraisal to which it has been related and the interdependence of efficacy and outcome expectations. The assessment issues address whether the method of measuing self-efficacy contributes to the correlations obtained between expectations and performance and the need to validate self-efficacy measures. In Eysenck's view, Bandura fails to realise that it is not sufficient to prove the existence of expectancy

and self-efficacy elements in order to demonstrate their causal roles in the sequence of events which bring about behaviour and behavioural change. Eysenck feels that Bandura's failure to deal with alternative, non-cognitive theories is perhaps the weakest apsect of his paper. In Eysenck's view, cognitive theorists reject noncognitive theories for no good experimental reason and they associate with cognitive views in the absence of good experimental support. Sysenck comments that Bandura's paper begins with the paradox that modern theories of behaviour change tend to be cognitive in nature while the methods which actually produce such behaviour changes are performance based. Eysenck goes on to quote Bandura "experiences based on performance accomplishments produced higher, more generalized, and stronger efficacy expectations than did vicarious experience". Eysenck feels that this is insufficient as similar predictions would be made by conditioning theory. Also, quoting Bandura again, "in all conditions, the stronger the efficacy expectations, the higher was the likelihood that a particular task would be successfully completed." These consequences, according to Eysenck, would be just as well predicted from conditioning theory as from social learning theory. He feels that the real issue, that of the causal relevance of expectancy, is not raised in the experiments. Eysenck concludes that Bandura presents an interesting alternative to classical therories and their more recent modifications but that Bandura fails to present any evidence for what Eysenck feels is the crucial question of the causal influence of cognitive elements in the total sequence of events which lead to neurosis or to recovery.

Wolpe follows a similar line of reasoning to Eysenck in his criticism of self-efficacy theory. Wolpe (1978) says that Bandura claims that treatments that succeed in eliminating neurotic fears do so not by directly weakening anxiety response habits, but through the mediation of expectations of self-efficacy. Bandura came to this conclusion because of his success in treating phobic cases by methods involving modeling, especially participant

modeling. However, in Wolpe's view, Bandura ignored the fact that emotional and conditioning processes were also going on during these treatments. Wolpe argues that the approach behaviour of phobic subjects to feared objects is exhibited by their anticipation of aversive consequences in the form of anxiety that one approaches entail, and therefore the elimination of anxiety responses is the primary therapeutic requirement. Wolpe believes that expectations of self-efficacy are derived only from performance accomplishments and not, contrary to Bandura's view, also from vicarious experience and verbal persuasion. In every case, the power of a cognitive stimulus to elicit a response of whatever kind is the result of learning. Verbal and other informative inputs can increase expectations of self-efficacy only by decreasing the perceived magnitude of the task.

Wolpe notes that Bandura applies no behaviour analysis to his subjects and goes on to stress the importance of identifying the stimulus determinants of emotional behaviour. Wolpe comments that whenever there is a coping skill it always involves a motor performance. He backs this up using a statement from Bandura's theory, "people fear and tend to avoid threatening situations they believe exceed their coping skills, whereas they get involved in activities they believe behave assuredly when they judge themselves capable of handling situations that would otherwise be intimidating".

Bandura (1977) cites studies which provide substantial negative evidence concerning an anxiety meditional mechanism in avoidance behaviour. Social learning theory regards anxiety and defensive behaviour as coeffects rather than as causally linked. Being coeffects, there is no fixed relationship between autonomic arousal and actions. Perceived threats activate defensive behaviour because of their predictive value rather than their aversive quality, i.e., individuals have learned to anticipate aversive consequences stimuli having predictive significance signal the likelihood of painful consequences unless protective measures are taken. Defensive

behaviour, in turn, is maintained by its success in forestalling or reducing the occurrence of aversive events. Once established, self-protective behaviour is difficult to eliminate even though the hazards no longer exist. The non-occurrence of anticipated hazards reinforces the expectation that the defensive maneouvers forestalled them. In the dual process theory, in which Wolpe believes, it is the extinction of anxiety that eliminates avoidance behaviour. However, Bandura comments that this theory provides no basis for predicting either the level of behaviour change or the variability in behaviour displayed by subjects who have all been equally desensitized. In the social learning view reducing physiological arousal improved performance by raising efficacy expectations rather than by eliminating a drive that instigates the defensive behaviour. Because arousal is only one of several sources of efficacy information and not necessarily the most dependable one, extinguishing anxiety arousal is rarely a sufficient condition for eliminating defensive behaviour.

However, Wolpe concludes that while participant modeling is clearly a very effective and economical treatment for certain fears, its character prevents its use in a great many cases. He believes that it is likely that it works, as other treatments do, by measuring anxiety response habits. Increases in self-efficacy logically follow fear elimination. Wolpe is of the view that the proposition that they are the primary mechanism of thereapeutic change is not supported by the facts.

Tryon (1981) states that Bandura has reported data demonstrating that efficacy expectations correlate better with actual performance in a behavioural approach test than scores derived from performance measures during treatment. He notes that Bandura then concluded that these results validated his hypothesis concerning the self-system being the central mediating construct unifying all behaivour change data. According to Tryon, Bandura allowed for the possibility that some other superordinate mediator might account for his results, but omitted any discussion of how alternatives

explanations, such as social reinforcement contingencies, might do so. Eysenck (1978) has also criticised Bandura on this point. Tryon is of the view that Bandura has ignored the literature on the susceptibility of behavioural approach tests to social contexts. Tryon feels that the notion of self-efficacy judgements as a unifying theory of behavioural change has serious limitations. Further, the apparent unification is likely to be attributable to the controlling influence of social demand across experimental conditions.

Sappington (1978) argues that Bandura's assessment of self-efficacy essentially measures willingness to perform behaviour, not subjective expectancies of ability to perform behaviour. Sappington is of the view that the available data provide more support for viewing meaning as a unifying theoretical framework for explaining behaviour change than self-efficacy. Sappington states that furthermore, meaning can provide a unifying theoretical framework for many apparently diverse areas of personality theory other than the areas of therapeutic behaviour changes.

Lastly, Kendall and Kargeski (1979) comment that treatment has yet to focus specifically on the improvement of self-efficacy using subsequent analysis of prepost change in self-efficacy as evidence that improved behaviour was the result of changes in self-efficacy. However, studies are now attempting this line of research concerning self-efficacy.

In summary, most of the criticisms appear to find alternative explanations for self-efficacy equally or more acceptable than postulating self-efficacy as a unifying concept. The authors of these critiques find the absence of discussion of alternatives a weakness of Bandura's theory. However, Bandura, in replying to some of these criticisms has adequately explained behaviour in self-efficacy terms, although some issues remain to be clarified.

3. RESEARCH

(i) Anxiety and Phobic Reations

It is regards phobic behaviour, one of the first studies was done by Bandura & Adams (1977) with two experiments. The first involved the hypothesis that systematic desensitization affects changes in avoidance behaviour by creating and strengthening expectations of personal efficacy. Snake phobics were used as subjects. The second experiment hypothesized that changes in efficacy expectations instated by partial mastery experiences would accurately predict the level of subsequent behavioural change. A microanalysis of congruence between self-efficacy and performance showed self-efficacy to be a highly accurate predictor of degree of behavioural change following complete desensitization. Findings also lend support to the view that perceived self-efficacy mediates anxiety arousal. Bandura, Adams and Beyer (1977) administered adult phobics treatments based on either performance mastery experiences, vicarious experiences or they received no treatment. Although explanations of behavioural change are relying more heavily upon cognitive mechanisms, it is performance treatments that operate through mastery experiences that prove most powerful in producing affective, attitudinal and behavioural changes. Regardless of the methods involved, treatments implemented through actual performance achieve results consistently superior to those bases upon symbolic forms of the same approaches.

The theoretical formulation of the cognitive mechanism mediating behavioural change systematizes the diverse findings obtained in this study. In accord with prediction, participant modeling produced higher, more generalized and stronger expectations of perceived efficacy than did modeling alone. Self-efficacy, in turn, proved to be a consistently accurate predictor of performance of tasks carying in difficulty with dissimilar threats and for diverse modes of treatment. Evidence from several lines of research show that anxiety and defensive behaviour are coeffects rather than causally related.

Bandura, Adams, Hardy and Howells (1980) looked at the explanatory and predictive generality of self-efficacy theory across additional treatment modalities and behavioural domains. An untreated control group, however, was not included. Accounting for intergroup variability and variations in performance by individuals across different tasks imposes far more stringent explanatory and predictive requirements than does simply demonstrating that treatment enhances efficacy and performance relative to a control group. The most stringent tests of a theory explore the links between environmental influences, indicants of the critical mediating process and action. They attempt to demonstrate that antecedent influences operate on behaviour through the hypothesized mechansism.

Bandura et al (1980) confirmed that self-percepts of efficacy whether produced enactively, vicariously, emotionally, or cognitively, predict not only level of behavioural change resulting from different modes of treatment, but variations in coping behaviour by different individuals receiving the same type of treatment, and even specific performance attainments by individuals on different tasks. Results also indicate that perception of ones coping capabilities affects emotional arousal as well as behaviour. Being able to exercise behaivoural control over aversive events reduces autonomic arousal even though the control may not be put into use. It is the self knowledge of coping efficacy rather than its application that reduces arousal.

Biran and Wilson (1981) compared two treatments for simple phobics. They found that guided exposure was significantly superior to cognitive restructuring in enhancing approach behaviour, increasing level and strength of self-efficacy, reducing subjective fear and decreasing physiological reactivity to imagined phobic scenes. Bandura (1977) tested the idea that increasing self-efficacy results in a reduction in a subjective and autonomic arousal. However, results showed that neither level nor strength of self-efficacy was related to the fear arousal measures.

Sappington,Russell, Triplett and Goodwin (1981) investigated the relationship of four types of expectancy to snake avoidance behaviour and its reduction through modeling. Results found that all four expectancy variables correlate significantly with behaviour on a snake avoidance task. Self-efficacy expectancies were not clearly better predictors of behaviour than were response-outcome expectancies. Sappington et al. concluded that a four-variable expectancy model is necessary to explain avoidant behaviour, in contrast to Bandura stressing the importance of one type of expectancy.

(ii) Smoking

Studies looking at anxiety and phobics provide support for the explanatory and predictive power of the theory and the applicability of the construct across a wide range of behaviours. However, as Di Clemente, Prochaska and Gibertina (1982) note, many questions remain. Self-efficacy is a behaviour specific construct. An individuals efficacy expectations for phobic reactions differ from those regarding achievement striving and physical stamina. Many previous studies examined specific graduated outcome behaviours easily enumerated and measured. Measures of self-efficacy have been found to be useful and important in the prediction of cessation and maintenance for smoking behaviour. Using scales which vary in item content and number, several investigators have demonstrated that efficacy expectations predict successful completion of a smoking treatment programme, posttreatment relapse (Di Clemente, 1981; Condiotte & Lichtenstein, 1981), and follow-up smoking rate. Treatment of different types improve efficacy expectations (Condiotte & Lichtenstein, 1981) and the predictive relationship between self-efficacy and recidivism hold true for both treated and untreated smokers (Di Clemente, 1981).

One of the first studies relating self-efficacy to smoking was Chambliss and Murray, (1979a). This study evaluated two cognitive procedures for reducing smoking. The results showed that the self-efficacy condition

resulted in much greater reduction in smoking than in the drug efficacy condition. The efficacy manipulation had little effect on external subjects. Chambliss and Murray conclude that the results clearly support the importance of increasing self-efficacy in procedures to reduce smoking. However, such procedures interact with locus of control and may even be limited to internals.

In a study by Condiotte and Lichtenstein (1981), smokers efficacy states were found to be significantly enhanced as a result of treatment. A micro-analysis revealed an extremely high correspondence between the cluster of smoking situations in which relapsing subjects experienced a low degree of self-efficacy and the situation in which the first relapse occurred. Condiotte and Lichtenstein comment that the basic hypothesis underlying Bandura's (1977) theory that effective therapeutic techniques achieve positive outcomes through the enhancement of self-efficacy cannot be unravelled by correlational data alone. Self-efficacy may simply covary with behaviour due to the effect of some superordinate mediator. They go on to say however, that prediction can be accomplished in total ignorance of an understanding of causal relationships.

Di Clemente has done a number of studies involving self-efficacy and smoking cessation. In Di Clemente (1981) situations were identified by subjects in a pilot study as important factors in relapse episodes. The resulting measure of self-efficacy for avoiding smoking was used to analyse the relationship between self-efficacy and subjects ability to maintain post-treatment abstinence at five month follow-up. Two thirds of all subjects successfully maintained nonsmoking at follow-up. These results supported previous findings that efficacy expectations showed predictive superiority over past performance and involved more than performance self-evaluation. The measure of self-efficacy for smoking avoidance demonstrated good internal consistency and initial indications of validity. The design and data of the study did not allow for complete elimination of alternative explanations

of what the efficacy expectations were measuring. Efficacy expectations could be measuring a general motivation or expectation variable rather than the construct of self-efficacy. However, preliminary indications of the independence of measured self-efficacy from other variables measured in the study were adequate and further research would be needed to resolve these ideas.

Di Clemente and Prochaska (1981) explain that change is not an all or none phenomena, but appears to follow distinct and separable stages, namely contemplation, decision, active change, maintenance and relapse or maintained change. The study involved 900 subjects from all stages. Self-efficacy ratings appear to discriminate between smokers and nonsmokers and between nonsmokers at different stages of maintenance. In addition it appeared that self-efficacy ratings at the time of the first assessment were related to movement through the stages of change of smoking cessation at the second assessment. Additonally, there was assessment not only of the subjects' confidence to resist smoking, but also their temptation to smoke in each situation (strength of cue) in order to examine more thoroughly how these relate to smoking cessation and maintenance. A moderate negative correlation was found between temptation and confidence scores. Although they share 36% of the variance they seem distinct but related interactive aspects of self-evaluation. Di Clemente and Prochaska summarize their findings: (i) self-efficacy appears to be an important element of self-change. Subjects' expectations of their ability to not smoke over a wide range of situations accurately represent their actual status as smokers and nonsmokers as well as their time in the maintenance cycle; (ii) self-efficacy expectations appear related to subjects' ability to maintain smoking cessation and their movement through the stages of self-change; (iii) there appears to be several subsets or components of self-efficacy in the 31 item scale. Negative affect seems to be the most important element with regard to cues for smoking. For smoking and other health related behaviours, cues are not

as clear as in phobic behaviours. It is important to analyse the strength of these cues (temptation) as well as the confidence; (iv) self-efficacy ratings appear to be relatively independent of other subject characteristics. Thus, this self-evaluation is not just a reflection of a general characteristic of persistence, nor is it simply related to other smoking characteristics; (v) it is difficult to ascertain whether self-efficacy determines the use of certain processes or use and awareness of various processes determine self-efficacy. It is most likely an interactive relationship between self-efficacy and the individual processes of change that relate to smoking cessation and maintenance.

Di Clemente, Prochaska and Gibertini (1982) explored the measurement, validity, and predictability of self-efficacy in self-change in smoking behaviour. The results of this large scale analysis supported the following conclusions: (i) the self-efficacy scale used in this study proved to be an extremely reliable and coherent instrument with identifiable but not independent subcomponents. (ii) efficacy expectations emerged as self-evaluations independent of other cognitive, behavioural and trait dimensions. In addition, conclusions from Di Clemente and Prochaska (1981) were backed up.

Bandura's (1977) assertion that self-efficacy is only partly determined by past behaviour is supported by the finding of negligible correlation between number of problems experiences while quitting, number of years as a smoker, number of previous attempts to quit, number of cigarettes smoked per day, and self-efficacy. Among the smokers, self-efficacy was not successful in distinguishing the stage of change which the subject was in. This finding seems due, in part, to the fact that the subjects were moving through the stages of change at different rates and in different directions. The self-efficacy scale seems valuable in suggesting high risk situations and in discriminating which subjects are likely to succeed in quitting and which are likely to experience relapse. It seems that self-efficacy,

while it may in some sense, be composed of or caused by a multitude of behaviour, cognitions, or traits, it is not, at present, reducible to any single process or structure.

(iii) Weight Loss

The design and detail of the latter few studies on smoking provide good examples for attempts to look at self-efficacy and how it relates to weight loss. Only one study however, has been looked at this behaviour. Chambliss and Murray (1979b) tested the view that a person's general beliefs about the effectiveness of their behaviour on subsequent events should be related to the specific belief of self-efficacy in weight reduction. They comment that inconsistent results have been reported in relating Rotter's locus of control to success in weight loss programmes. However, these programmes vary a great deal in the degree to which they enhance self-efficacy (Strickland, 1978). The authors present study was similar to the one they had done on smoking and produced consistent results. The results showed that a weight reduction programme designed to increase self-efficacy beliefs is quite successful with internals, but unsuccessful with externals who appear to respond somewhat better to a programme in which success is attributed to medication. Results are consistent with other work showing greater therapeutic success when there is congruence between personal expectations and characteristics of the treatment situation (Strickland, 1978).

(iv) Learned Helplessness and Depression

Brown and Inouye (1978) tested the hypothesis that learned helplessness can be induced through modeling and that the effects are mediated by perceived similarity in competence. Studies of learned helplessness in humans have demonstrated that a variety of experiences involving aversive consequences for failure can undermine subsequent performance. Maier and

Seligman (1976) have proposed that the various effects which characterize learned helplessness are mediated by subjects' expectations of controllability. As a result of being subjected to uncontrollable events, persons come to expect that they cannot affect outcome through their actions in other situations as well. The authors found that the higher the subjects' expectations of efficacy, the longer they persisted on tasks for which they were unable to find solutions. Brown & Inouye (1978) concluded that (1) because helplessness effects were induced vicariously, the findings indicate that it is the cognition of uncontrolability that is critical for producing performance decrements; (2) perceived similarity in competence is a critical variable mediating the effects of modeled helplessness. Observing a model fail can either undermine or increase efficacy expectations and persistence, depending on perceptions of relative competence; (3) modeled helplessness and perceived similarity continue to influence self-perception and motivation even after subjects have had considerable direct experience with a task; (4) the results also provide support for the SE view that social experiences influence performance through their effects on efficacy expectations. The dynamic relationship between SE and persistence is revealed in the increasing conguence between those variables with continued experience.

Zeiss, Lweisohn and Munoz (1979) looked at nonspecific improvement effects in depression using interpersonal skills training, pleasant activities schedules, or cognitive training. Bandura (1977) states that effective therapy alters the sense of personal efficacy, and is often best done through performance based procedures with a relatively specific focus. Most of the current theoretically derived therapies assume that depressives show specific competence deficits. In this study all of the treatments had nonspecific effects. By various routes all patients began to have positive experiences in their daily lives, which they attributed to their increased SE. They suggest that the treatments affected depression because all treat-

ments provided training in self-help skills, thus increasing the patients' expectations of mastery and encouraging the perception of greater positive reinforcement as a function of the patients greater skillfulness. Kanfer (1981) investigated the relationship between standard-setting and SE expectations in the domain of interpersonal functioning for depressed and non-depressed subjects. Consistent with the self-control model of depression, large discrepancies between personal standards and efficacy expectations for performance were postulated to be related to depression. Implications derived from Lewinsohn's model of depression suggests that the magnitude of the discrepancy obtained would be primarily due to lowered SE expectations in depressives. In contrast, implications derived from Beck's model of depression suggests that the magnitude of the discrepancy obtained would be primarily due to elevated standards for performance in depressives as compared to normals.

Results obtained are consistent with recent extensions of Lewinsohn's model of depression which suggest that disruptions of self-evaluation are related to lowered SE expectations for depressives. Beck's position that disruptions in self-evaluation are related to elevation of standards is not supported by present findings.

Davis and Yates (1982) looked at SE expectancies versus outcome expectancies as determinants of performance deficits and depressive affect. Combined performance deficit and negative affect that constitute depression should occur only if self-response expectancy is low and response outcome expectancy is high. Contrary to the early learned helplessness theory of depression then, low response outcome expectancy does not by itself produce depression. Three more requirements for depression deducible from Bandura's SE theory are that attainments of the outcome is highly valued by the individual, that outcome can be attained, in the person's perception, only via the responses included in the low self-response expectancy schemes and the person generalizes the low self-response expectancy to a high proportion

of other self-response expectancies attached to important outcomes.

Combined performance deficits and depressive affect were found only when self-response expectancy was low and response outcome expectancy was high, supporting SE theory. Findings were produced only for male, not female subjects. They suggest that females set their self-response expectancies low before manipulation to avoid depression. Expectancy rating also showed that self-response expectancies correlated more strongly with performance than did response outcome expectancies.

(v) Assertiveness

The following studies look at the relationship between assertiveness and self-efficacy. Kazdin (1979) examined the effects of client elaboration of imagery during covert modeling treatment and the effects of treatment of unassertiveness and self-efficacy. Treatment effects transferred to novel role-playing scenes and were maintained up to the six month follow-up assessment. Treatment effects brought subjects within the range of other subjects who regarded themselves as particularly proficient in social situations requiring assertive behaviour and had not sought treatment. Lefebvre (1981) investigated the role of self-efficacy expectations in mediating initial assertive behaviour change and its subsequent generalization. Results showed that efficacy expectations could not significantly predict assertive behaviour but did predict satisfaction with one's performance. Lefebvre concluded that the role of self-efficacy in mediating assertive behaviour received meager support. Valerio and Stone (1982) investigated the interaction of demonstrated knowledge of assertive behaviour with treatments for nonassertive behaviour in order to help clarify the interaction of deficits with treatments. Results supported the effectiveness of each treatment and stability of treatment effect over a long-term follow-up, but failed to support a differential treatment approach to assertion based on demonstrated knowledge. Behavioural and cognitive treatments seemed to have the greatest effect on measures that were similar to the other treatment. Thus, the present study supports the

position that cognitive and behavioural treatments have a wide range of effects extending beyond their specific avenue of treatment so that there is not necessarily a one-to-one relationship between a deficit and a treatment. Treatment groups had significantly higher self-efficacy scores than the controls and self-efficacy correlated significantly with many dependent variables.

Pentz (1981) investigated the relative contribution of training variables and individual differences to assertion training outcome in adolescents selected for their unassertive or aggressive behaviour with teachers. Results suggest that in short-term social skills modeling programmes, individual differences may have a relatively great effect on assertion training outcome. Correlational analyses indicated that low anxiety and high verbal reasoning produced higher levels of self-efficacy and assertive behaviour. Results suggest that other powerful contingencies may be operating on self-efficacy and assertive behaviour in adolescents.

(vi) Stress Innoculation

Stress innoculation is another area which has been looked at in terms of self-efficacy. Jaremko, Hadfield and Walker (1980) found that with speech anxious subjects an educational component was a potent part of the stress innoculation procedure. They note however, that a well controlled comparison is needed. Parrino (1977) and Seidner (1973) provide data supporting the notion that an educational rationale enhances therapeutic effectiveness. Conceptually, Jaremiko, Hadfield and Walker (1980) state that their results can be justified on the basis of the literature on perceived control. Providing the person with a plausible rationale for his/her fear responses may well increase the person's perceived control over the situation. The efficacy of perceived control is well documented (Averill, 1973). Harmon-Bowman (1981) looked at stress innoculation training,specifically the effect of self-efficacy and education treatment

on trainee performance. Results found that low self-efficacy trainees reported lower performance under the education treatment while high self-efficacy trainees reported higher performance under the education treatment.

(vii) General

A number of other studies have looked at self-efficacy and a more general effect on behaviour. Maddux et al. (1980) demonstrated that expectations of outcome and self-eficacy can be successfully manipulated by verbal persuasion and that these expectancies can cause changes in behavioural intentions. The three major findings of interest were (1) increments in self-efficacy expectancy caused significant increases in intentions to perform the behaviour described; (2) increments in self-efficacy expectancy did not produce corresponding significant increases in intentions, though a trend was found in the predicted direction; and (3) outcome expectancy influenced perceptions of self-efficacy. They propose that the risk of aversive consequences involved in attempting yet failing to correctly perform a behaviour may determine the extent to which self-efficacy expectancy affect decisions about behaviour. When a behaviour is presented as relatively difficult to perform, individuals who believe the behaviour is more likely to result in a favourable consequence may express greater confidence in their ability to perform the behaviour than those who perceive a relatively weak relationship between the behaviour and its outcome. For a behaviour presented as relatively easy to perform, outcome expectancy may have less influence on expectations of self-efficacy.

Rosenbaum (1980) described the development of a schedule for assessing self-control behaviours. In relation to self-efficacy, before a person applies any specific self-controlling skill, in Rosenbaum's view, s/he must believe that s/he can control his/her own behaviour without outside help. Glass and Levy (1982) looked at perception of control and its role in the therapeutic benefits attributed to biofeedback. Results support the import-

ance of cognitive factors in biofeedback training. Perceived self-control alone may lead to positive psychological change and many of the same moods, self-perceptions and behaviours often attributed to biofeedback training or actual physiological control. Although success in biofeedback may produce desirable psychological change, individuals may not automatically generalize these feelings of self-mastery and positive affect to new situations. It may be the case that cognition of self-efficacy play a role in the mediation of situations of both actual and perceived physiological control. Results of this study suggest that feelings of self-efficacy may be one component of a complex pattern of responses related to the self-regulation process.

Ilfeld (1980) looked at the effectiveness of coping styles of adults and among other things, feelings of low self-efficacy. Results showed that as a group, coping strategies are more predictive of the stressor situation and feelings of personal distress than of psychiatric symptomatology or feelings of low self-efficacy. Some coping styles are strongly predictive of low amounts of stressors, this is particularly true of the use of strategies that involve direct action.

Cresswell, Lorne and Zautra (1981) did an assessment of life quality and life stressors. Results indicated that family support concerns were the most predictive of perceptions of self-efficacy. Until recently, most research on life events has assumed that the stressfulness of a life event was predominantly derived from the stimulus properties of the event itself. Although there is some evidence of considerable interjudge reliability in ratings of the stressfulness of life events, there have been numerous challenges to the notion that life events have properties that are universally stressful. Several investigators have shown that events subjectively appraised as positive were either much less stressful or not stressful at all in terms of their impact on measures of maladjustment and psychiatric distress. Results showed that although positive events were significant predictors of self-efficacy, self-efficacy was more strongly affected by the

occurrence of negative events. Employees with more education reported more self-efficacy satisfactions. Results were also consistent with growing literature indicating the central role of family supports in perceptions of well being and security. Satisfaction with the quality of one's leisure activities was an unexpectededly strong predictor of self-efficacy. Often overlooked is the need for simple leisure activities to relieve stress. Results indicated that positive perceptions of self-efficacy in general and job, family support and financial experience were related to positive life events. However, the prevention of negative events may have more of an impact on an individual's life than promoting positive ones.

(viii) Career Development

In terms of self-efficacy and career development Dougher (1981) developed and evaluated the impact of cognitive restructuring interventions on negative self-esteem and self-efficacy regarding career development behaviours. The results indicated that level of self-esteem/self-efficacy in college women can be increased relative to a waiting control intervention by a treatment that focuses on cognitive restructuring.

Hackett and Betz (1981) present a model postulating that largely as a result of socialization experiences, women lack strong expectations of personal efficacy in relationship to many career-related behaviours and thus fail to fully realize their capabilities and talent in career pursuits. Internal barriers are low or weak self-efficacy expectations and strong self-efficacy expectations are needed to cope with external barriers (e.g., discrimination, lack of support systems). Thus, self-efficacy theory is considered relevant to the conceptualization and modification of internal barriers and to the management of external barriers. Sex differences in the access to and availability of performance accomplishment, vicarious learning, verbal persuasion and emotional arousal, are important to the development of strong expectations of personal efficacy and relate to

women's career decisions and achievements. The model is intended to be suggestive and needs to be empirically investigated.

(ix) Pain

An interesting example of the applicaiton of self-efficacy expectations is by Manning (1981). This study looked at the attempts of 52 female subjects to control the pain of childbirth without medication. Self-efficacy expectancy, outcome expectancy and importance were all significantly related to medication use in labour and delivery. Self-efficacy expectancy contrib-usted significantly more of the unique variance in the prediction of the medication use criteria than either outcome expectancy or importance, or the two variables in combination.

(x) Sport

A number of studies have been done relating to sport and self-efficacy. Self-efficacy literature focusing on motor performance is both sparse and fraught with methodological problems. Many self-efficacy studies in this area have examined avoidance behaviour with no attention being directed at self-efficacy in competitive situations.

Weinburg, Gould and Jackson (1979) found a strong correlational relationship between self-efficacy and performance on a muscular endurance task. In the face of aversive experiences (failure) high efficacy subjects exhibited an increase in persistence, whereas low efficacy subjects displayed a decrease in persistence.

Weinburg, Yukelson and Jackson (1980) looked at the effect of public and private efficacy expectations on competitive performance. A sex difference was found with high efficacy males performing significantly better than low efficacy males, whereas high and low efficacy females exhibited no differences in performance. However, type of competition appears to be an important variable when investigating efficacy and sex

differences on competitive motor tasks. The results supported self-efficacy predictors, but the public/private manipulation produced no significant performance effects. It has been suggested (McClements & Botterill, 1979) that public statements of performance expectancies are most effective when made in front of significant others. Future studies should test the effects of an individual's degree of commitment to a public performance expectancy upon subsequent performance by manipulating the importance of the competition or the social evaluation inherent in the situation.

Shelton and Mahoney (1978) looked at psyching up strategies used by weightlifters and found self-efficacy statements to be the second most popular strategy used after what they termed control of attention.

Feltz, Landers and Raeder (1979) looked at the effectiveness of participant, live and videotaped modeling on the learning of a high-avoidance springboard diving task. Results indicated that the participant modeling treatment produced more successful dives and stronger expectancies of personal efficacy than either the live modeling or videotaped modeling treatments. In studies so far (Bandura, Adams & Beyer, 1977) including this one, anxiety has not been measured directly and anxiety/avoidance has only been inferred from performance measures.

Gould and Weiss (1981) designed a study to determine if observing a similar or dissimilar model who makes varying self-efficacy statements influences an oberver's efficacy expectations and in turn muscular endurance performance. Similar models were superior in increasing performance in subjects. Self-efficacy alone however may not be the sole mediating variable explicating the performance not only by increasing efficacy through conveying information, but by heightening the social comparison process and increasing observer motivation.

(xi) Children and Adolescents

A number of studies have demonstrated the usefulness of the concept of self-efficacy with children and adolescents. Jason (1980) incorporated techniques in physiological cognitive and behaviour modalities into a

broad based intervention programme focusing on the acquisition of coping responses to handle life transitions for a group of adolescents. It was hypothesized that students exposed to such a programme evidence higher self-efficacy and would use more cognitive restructuring strategies and problem solving skills. Results supported the hypothesis.

Schunk (1981) looked at effort attribution. Results showed that attributing prior acheivement to effort promotes task involvement, skill development and perceived efficacy. Conversely, stressing the value of future effort to children does not promote achievement behaviour over what can be expected through merely providing training. These findings are consistent with self-efficacy theory. Past performance provides authentic information for judging personal capabilities; successes raise self-efficacy while failures lower it. Suggestions that expenditure of effort produced achievement further validate personal efficaciousness. Persons who ascribe failure primarily to a lack of effort are more likely to believe they can succeed in the future than persons who ascribe failure more to a lack of ability or high task difficulty. Conversely, success attributed largely to great effort may result in a weaker expectation of future success than success ascribed mainly to high ability or task ease (Weiner, 1980). Research has shown that stressing effort in connection with prior outcomes results in greater persistence (Andrews & Delors, 1978; Chapin & Dyck, 1976; Dueck, 1975). While both prior and future effort attribution have been used together in previous research (Chapin & Dyck, 1976; Schunk, 1981), their implications may differ.

Tyler and Gatz (1977) looked at the development if individual psychosocial competence in a high school setting. Their findings confirmed the importance of sociocultural factors in individual psychosocial change patterns and the potential therapeutic impact of relatively brief psychoeducational and psychotherapeutic interventions. The person who functions competently is characterized by a more active coping orientation, high

initiative, realistic goal setting, substantial planning, forbearance, and effort in attaining goals, a capacity of enjoying sucesses and suffering failures and building from both. The competent self includes a sense of self-efficacy, however, this was measured by Rotter's locus of control.

Schunk (1980) looked at achievement and interest in children under conditions involving a proximal goal, a distal goal or no explicit goal. The proximal goal treatment produced more rapid sense of mastery, a higher level of skill development, a stronger sense of self-efficacy and greater interest in the topic. The distal goal condition did not differ from the no-goal condition in promoting change. Proximal goals provide immediate incentives and guides for performance, influencing performance through motivational effects. In additon, the influence self-efficacy. Self-efficacy develops when people have clear standards against which they can compare their progress. Proximal goals provide such standards at repeated intervals along the way to more global goal attainment. In addition, Schunk found that the 'threshold hypothesis' appears to hold. A minimum level of perceived competence is required for interest to be shown in an activity, but variations in self-efficacy beyond this level don't differentially affect interest.

Schunk (1981) looked at modeling and attributional effects on children's achievement. Results suported predictions from self-efficacy theory. Children with higher percepts of self-efficacy subsequently persisted longer and achieved more success than their less efficacious and persistent counterparts. The hypothesis that attributing successes and difficulties to effort should influence self-efficacy, persistence and skill accomplishment with modeling failed to receive support. This is consistent with Chapin and Dyck (1976) that effects of effort attrivution depend on the performance context in which it occurs. Present research lends support to the idea that children's self perceptions of their capabilities have an important effect on their subsequent achievements. Similar results were obtained by

Covington and Omelid (1979a) who, using adults as subjects, found that people's expectations of successful performance were one of the best predictors of how well they later performed.

Bandura and Schunk (1981) looked at cultivating competence, self-efficacy and intrinsic interest through proximal self-motivation. Results showed that under proximal subgoals,children progressed rapidly in self-directed learning, achieved substantial mastery and developed a sense of personal efficacy and intrinsic interest. An important cognitively based source of self-motivation relies on the intervening processes of goal setting and self-evaluative reations to one's own behaviour. There is suggestive evidence that the impact of goals on behaviour is determined by how far in the future they are projected. Without standards against which to measure their performances, people have little basis for judging how they are doing or gauging their capabilities. Subglobal attainments provide indicants of mastery for enhancing self-efficacy. When people aim for and master desired levels of performance, they experience a sense of satis-faction. The satisfactions derived from subgoal attainments can build intrinsic interest.

(xii) Summary

Initial support for the construct and theory of self-efficacy has been demonstrated with anxiety and phobic reactions. Bandura (1982) notes a variety of studies applying different modes of influence to diverse domains of functioning support further the issue of perceived self-efficacy as a common mechanism moderating psychological changes. Perceived self-efficacy predicts among a variety of behaviours, the degree of change in diverse types of social behaviour (Kazdin, 1979; Barrios, 1979); varieties of phobic dysfunctions (Biran & Wilson, 1982; Borque & Landoweur, 1980; Bandura & Adams, 1977); stress reactions and physiological arousal (Bandura et al., 1982); physical stamina (Weiburg et al., 1979; Weinburg, Yukelson & Jackson,

1980); self-regulation of addictive behaviour (Dondiotte & Lichtenstein, 1981; Di Clemente, 1981); achievement strivings (Bandura & Schunk, 1981; Collins, 1982; Schunk, 1981) and career choice and development (Betz & Hackett, 1981; Hackett & Betz, 1981). In these diverse lines of research, predictive success is achieved across time, settings, performance variants, expressive modalities and vastly different domains of psychological functioning. Measures of self-percepts of efficacy using the microanalytic approach predict variations in level of changes produced by different modes of influence, variations among persons receiving the same mode of influence and even variations within individuals in regard to the particular tasks they are likely to master or fail (Bandura, 1977a; Bandura et al., 1980).

OBESITY

1. Prediction of Weight Loss

(i) Schachter's "Externality" Hypothesis

Bradley, Poser and Johnson (1980) note that a number of researchers have supported Schachter's finding that the eating patterns of the obese are overly determined by food cues in the environment (Schachter & Rodin, 1974; Rodin, Bray, Atkinson, Dahons, Greenway, Hamilton & Molitch, 1977; Quereshi, 1977). A considerable body of research has been generated over the last decade attempting to test Schacher's "externality" hypothesis (Conger, Conger, Contanzo, Wright and Matter, 1980). This hypothesis postulates that over-weight individuals are essentially unresponsive to internal hunger cues and instead eat in response to food-relevent cues such as the sight, taste, and smell of food (Schachter & Rodin, 1974; Schacheter, 1971a; 1971b). In contrast, normal weight individuals supposedly eat in response to an internal state of physiological hunger. Schacheter allows for the possibility that external factros may affect eating in normal weight individuals but only when they are in a state of physiological hunger (Schachter, 1971b). Nisbett and Storms (1974) comment that initial concept-

ualizations about what constituted a class of external cues were broad and encompassed such divergent factors as sensory properties of food, food and hunger cognitions and social cues that encouraged or discouraged eating. The potential explanatory power of the "externality" hypothesis lead to the inclusion of noneating situations in investigations. This had the effect of even further expanding the externality concept such that responsivity to external cues began to acquire a general trait status rather than remaining limited to the eating situaiton itself (Schachter & Rodin, 1974; Leon & Roth, 1977).

Rodin (1981) comments that the internal-external distinction is a widely held and cited framework used to explain differences between over-weight and average weight persons. Evidence is weak that the obese are generally external in orientation, however there is some supporting evidence that the obese are more responsive to sensory food cues than normal weight individuals, although the evidence is not perfectly clear cut (Conger et al., 1980). In addition, a variety of studies have shown that there are people in all weight categories who are highly responsive to external cues (Levitz, 1975; Nisbett & Temoshok, 1976; Price & Grinkler, 1973; Rodin et al., 1977), and this can, under specifiable conditions, lead to overeating in these individuals. Furthermore, the data suggest that internal sensitivity is not a unique characteristic of normal weight persons. There is now a great deal of evidence that even normal weight people show poor regulation when they only have internal signals to go on (Jordan, 1975; Speigel, 1973; Wooley, 1972).

It has become increasingly hard to identify any aspect of eating behaviour that is characteristic of all or even a large proportion of the overweight population (Mahoney, 1975; Wilson, 1980; Wooley et al., 1979; Rodin & Spitzer, 1980). Rather,degree of overweight is determined by a combination of genetic, metabolic, psychological, and environmental events.

To summarize, while there is reasonable empirical support for the

notion that overweight individuals are more responsive to external cues when they are sensory in nature (e.g., taste quality) (Nisbett & Storms, 1974; Leon & Roth, 1977), there is considerable data arguing against the simplistic notion that all overweight people are externally responsive and lack internal sensitivity and that people of average weight show the opposite pattern (Conger et al., 1980; Rodin, 1981).

(ii) Personality Variables and Locus of Control

Although common approach to prediction has been to relate personality measures to weight loss, it appears that personality variables do not differentiate consistently between the obese and nonobese (Stuart & Davis, 1972). Evidence is even less clear cut concerning their value as predictors of outcome during behavioural weight loss attempts (Gormally, Rasdin & Black, 1980; Kinley, 1981). Chavez and Michaels (1980) comment that studies on weight reduction that have investigated variables which predict success in a programme have achieved minimal results. One of the personality variables investigated has been internal-external locus of control. Rotter's (1966) locus of control construct refers to the individuals perception of the locus of causality of events. Internals believe that events in their lives result from their own actions or characteristics. Externals, in contrast believe their lives to be controlled by chance or by events over which they have no power. However, similarly, this construct has only been minimally useful in predicting success in behavioural weight reduction programmes.

A questionnaire which attempts to link locus of control closer to weight reduction is the Health locus of control. Chavez and Michaels (1980) attempted to evaluate this questionnaire in terms of predicting successes in a behavioural treatment programme. Internal subjects lost significantly more weight than did external subjects. In addition, internal subjects considered themselves more attractive than external ones, even

though they weighed significantly more. This suggests that the self-concepts of overweight internal persons may be better than those of overweight external ones. The authors suggest that Rotter's locus of control scale may lack a specific health focus and, therefore, may not be very predictive of health related behaviours.

Kincey (1981) comments that studies which have compared the obese and nonobese on measures of locus of control so far have produced inconsistent results (Howard, 1975), as have others who have attempted prediction of outcome in weight loss attempts (Balch & Ross, 1975). The variation in these results could be due to a number of factors, including the specific measuring instruments used, the populations involved, the treatment procedures used and the time span over which measurements were taken (Kincey, 1976). Gormally, Rardin & Black (1980) suggest that a problem of trait-based prediction models is that the measures typically were not designed to predict behaviour in specific situations. Along similar lines Wilson (1978) states, regarding obesity research, that the "emphasis should be on what the subject does in relation to specific controlling variables rather than on what the subject is like." He suggests that predictor variables should predict what the subject will do within the treatment programme rather than simply describe the subject.

(iii) Prediction and Social Learning Theory

A study that moves closer to self-efficacy concepts in terms of prediciton looked at expectations of weight loss. Bradley, Poser and Johnson (1980) asked obese subjects, about to enter a group programme intended to produce 'conditioned satiety', to estimate the number of pounds they expected to lose. The outcome expectation was found to correlate significantly with weight loss. However, the magnitude of expected weight loss exceeded the actual amount of weight loss.

A study by Conter, Conger, Constanzo, Wright and Matter (1980) also

investigated a prediction made by social learning theory. Bandura (1969) states that modeling can exert a strong influence on a variety of behaviours and support for this encompasses numerous areas. Testing this idea, Conger et al. (1980) found that both obese and normal weight subjects showed a clear modeling effect and all subjects evidenced social inhibition effects on their eating behaviour.

(iv) Conclusion

There appears to be justification for assuming that not all obese persons have similar characteristics (Leon & Roth, 1977), yet no research looking at responses to food or personality variables has been able to identify which differences among obese persons influence treatment outcome (Gormally, Rardin & Black, 1980).

2. MAINTENANCE

(i) Outcome Studies

In their review of twenty-five outcome studies, Gomally, Buese-Moscati, Ayman and Forbes (1977) concluded that although there were clear indications of maintenance in short term (three month) follow-ups, the longer the follow-up, the less likely the losses are maintained. Gormally (1980) found that more adequate, longer-term follow-ups revealed that weight losses start to reverse, usually around six months into follow-up. Post-treatment after a period of more than a year are rare (Jeffery, Wing and Stunkard, 1978) and do not allow clear cut statements. Mahoney and Mahoney (1976) report on a follow-up after fourteen months, Martin and Sachs (1973) report on a follow-up after two years for one of the patients treated by them Successes were reported in both cases, that is, maintenance or futher reduction of body weight. Hautzinger (1980) reassessed subjects three years after the termination of a weight reduction programme with relation to the long-term efficacy of behaviour oriented weight reduction programmes. Most of the

subjects stabilized their body weight or continued to reduce weight. The results support behavioural approaches to weight reduction in terms of maintenance. However, Gormally and Rarding (1981) report that the data on individual performance during follow-up are not impressive. Besides the lack of sustained weight losses during follow-up, researchers have reported more than a few isolated cases in which participants completely regained substantial weight losses (Bencke, Paulsen, McReynolds, Lutz and Kohrs, 1978; Gormally, Rardin and Black, 1980; Stunkard and Penick, 1979).

Only one study (Gormally, Rardin and Black, 1980) has compared maintainers and relapsers in order to identify specific competencies associated with successful weight control during follow-up. Gormally, Rardin and Black (1980) found that relapsers reported more life events that caused stress and served as cues for overeating. People who were successful at maintenance used frequent exercise during follow-up. Furthermore, successful response to behavioural treatment appears to be a factionally complex criterion, since both problem severity and behaviour changes correlate with initial weight loss. Thus, no single predictor is likely to account for a substantial portion of the variance in initial weight loss. It also appears that the problem severity is associated both with poor maintenance and initial weight loss. The authors state that their results demonstrate that the wide variability that has been observed in response to behavioural treatments can be partially explained by the characteristics of the participants in the treatment. They found that 67% of persons with previous dieting success regained, on average, half of their weight loss by the end of follow-up. The authors comment that the predictive efficiency of weight loss history seems to support Mischel's (1968) assertion that previous behaviour is often the better predictor of current behaviour when compared with trait-based prediction models, such as Rotter's internal-external scale.

Brownell and Stunkard (1978) reviewed reports on the results of behavioural programmes for weight loss and found no strong evidence to

support the view that weight loss in these programmes resulted from adherence to prescribed behaviours. Lansky (1981) is of the view, however, that there is evidence for a relationship between adherence to dietary behaviours and weight loss. When overall change in eating behaviours was evaluated separately for individuals, two studies yielded significant correlations with weight loss. Additionally, two reports on three individual patients found such a relationship. In Lanksy's view the negative findings may have been due to methodological shortcomings in the studies reporting them.

(ii) Summary

The short and mid-range effectiveness of behaviour-therapeutic programmes has been well supported. Lasting regulation through behaviour therapeutic programmes still awaits confirmation (Hautzinger, 1980). A behavioural approach still may be the best available option for treatment of moderate overweight, but low success rates indicate that current procedures are inadequate. Before new techniques are designed, however, research needs to uncover the reasons for treatment failures. The identification of behaviours that distinguish maintainers and relapsers may be helpful in the development of behavioural maintenance strategies. Gormally, Rardin and Black (1980) attempted to make such a distinction and that the relative lack of success in follow-up shows that weight loss maintenance is very difficult to attain. Being able to cope with stress and to make changes in sedentary life-styles appears to be associated with successful maintenance.

3. PHYSIOLOGICAL DIFFERENCES

(i) Introduction

New findings in the area of physiological differences between people make it easier to understand why behaviour therapy, although showing a decided improvement over its predecessors, still does not have substantial influence in weight loss and maintenance. Wooley, Wooley and Dynenforth

(1979) received theoretical, practical and social issues in behavioural treatments of obesity. Although showing superior maintenance, behavioural treatments of obesity typically produce small weight losses at a decelerating rate. Rather than reflecting poor compliance with treatment, in the authors' view, these findings are consistent with known compensatory metabolic changes that operate to show weight loss and promote regain. Other problems associated with dieting include failure of caloric regulation, heightening of response to sensory qualities of food and hunger, which are greatest under conditions of moderate restriction and unpredictability of access to food. Prognosis and treatment planning may be aided by consideration of historical difficulties of weight loss, the degree of hunger experienced on diets, which may reflect important physiological differences among individuals and the use of food to optimize arousal level. Additionally, Thompson, Jarvie, Lahey and Cureton (1982) review the effects of exercise on energy expenditure and suggest that changes in activity level are a more useful and effective intervention to treat at least some obese people.

(ii) Food Intake

Wooley et al. (1979) comments that the major assumption is behavioural treatments of obesity is that overweight is due to excess food consumption resulting from faulty eating habits. Learned behaviours hypothesized to contribute to overweight have included rapid rate of consumption, large bites, frequent feeding, ingestion of large quantities in a given meal or snack. However, one problem that others have noted (Mahoney, 1975a; Mahoney, 1976b) is the difficulty in defining faulty or maladaptive patterns. The conditions leading to faulty learning are not defined, the relationship of particular behaviour patterns to total food consumption is not known. Nor is there even good evidence to show that certain eating styles are correlated with obesity. The only difference that seems consistently to

emerge from comparisons of eating behaviour is that the intake of the obese is more dependent than that of the lean on food palatability (Rodin, 1976; Wooley & Wooley, 1975). Research on eating styles may still be useful. For example, there is some experimental as well as anecdotal evidence that slow eating (Wooley et al., 1975) and ingestion of protein foods enhance satiety (Booth, Chase & Campbell, 1970; Wooley, Wiiley & Williams, 1977). Such findings may have important practical value. Studies of the effect of meal frequency on rate of weight loss have produced inconsistent results (Garroy, 1974; Young, Scanlon, Topping, Simko & Lutwak, 1971). However, the fact that infrequent meal eating leads to storage of ingested calories does not necessarily imply that weight loss diets composed of frequent meals should promote weight loss. Further study is required to establish a clearcut rationale for modification of specific features of eating style as treatment strategy.

Several decades of research have shown that on the whole, the obese eat no more than the lean (Garrow, 1974), suggesting that important differences lie in energy expenditure. In addition, energy expenditure is tied to diet, showing a tendency to decrease with caloric restriction and increase with overfeeding, but to varying degrees in different individuals, so that some people's metabolic systems appear to respond in such a way to maintain leanness while others maintain a diposity. However, studies have not differentiated obese subjects in terms of static or dynamic weight gain. There are no data to answer the question whether during the periods in which weight is gained obese people have higher intakes than lean ones.

(iii) Energy Expenditure

In most individuals, basal metabolism and sedentary activity account for by far the largest portion of calories utilized and exercise the least. Thus, although there is some empirical grounding for increasing activity level in intervention, Wooley et al. assert that it cannot be assumed that

the difference between energy expenditure in obese and nonobese people rests on activity level. In addition, there is no prospective evidence to suggest that relative inactivity is a cause of obesity rather than an effect. There is evidence that activity is itself a regulated variable, decreasing for example, with caloric deprivation and varying with predictability feeding patterns. Whether or not it would prove easier to make lasting alterations in activity level than in food intake remains an open question.

(1) Wooley et al. (1979) review data suggesting that basal metabolic rate (resting rate - BMR) falls predictably with degree and duration of caloric deprivation. Dieting reduces energy expenditure in two ways: general lowering of BMR, the major source of energy expenditure (Bray, 1970; Garrow, 1978a; Wolley et al. 1979), and a decrease in energy used in performing a specific task (Apfelbaum, Bostsarron & Lactis, 1971; Bray, 1969; Buskirk, Thompson, Lutwak & Whedon, 1963; Drenick & Dennin, 1973; Garrow, 1974; Howard, Grant, Challand, Wraight & Edward, 1978; Keys, Brozek, Henschel, Mickelson & Taylor, 1950). This adaptive decrease in energy output, which has been reported to decrease BMR 15 to 30%, may approximate or equal the restricted energy intake through dieting. These factors may be directly responsible for the well established plateauing of weight loss while on caloric restriction (Buskirk, 1974; Cradock, 1978). The end result is a situation in which weight is stabilized and maintained even on a lower caloric intake (Bender & Bender, 1976; Bray, 1970; Garrow, 1978a). Additionally, these effects appear to be the most marked in subjects whose initial metabolic rate is low. Obese subjects with the lowest metabolic rates appear to have the biggest drop in rate during caloric restriction. Adaptive changes in energy expenditure may become more pronounced with each diet (Garrow, 1974). Additionally, metabolic changes associated with dieting predispose rapid gain and bias the system toward excessive storage of adispose tissue (Hamilton, 1969; Boyle, Storlie & Keesey, 1978).

(2) Overfeeding - it appears that lean subjects made experimentally

obese return rapidly and spontaneously to normal weight at the cessation of the forced feeding. Thus, overeating alone is not sufficient to cause most people to become or remain obese. The few overfeeding experiments that have used obese subjects suggest that they do not dispose as readily of excess calories (Passmore, Strong, Swindells & El Din, 1963; Passmore, Meiklejohn, Dewar & Thow, 1955; Mahler, 1972). Alternatively, as metabolic rate is depressed during dieting, it may be a consequence of recent eating histories. As adaptive mechanism, which acts to conserve calories in the face of restriction may also act to encourage energy storage. The problem of obesity could be due to irreversibility of such mechanisms.

(3) Summary. It seems clear that people may be overweight without eating more than lean people and quite apart from differences in activity level. The implications for behavioural treatment include the need to attend to individual differences, to understand that treatment failures may not reflect noncompliance or cheating, and consideration of the pattern of dieting least likely to produce unwanted effects. Specific suggestions might include increases in activity during refeeding to promote thermogenesis and the use of only brief periods of caloric restriction with intermittent return to normal eating.

(iv) Prolonged Caloric Restriction

(1) Hunger. It appears that more restrictive diets result in greater suppression of hunger. This may mean that programmes that involve moderate restriction of calories will lead to greater levels of hunger than more extreme diets. In addition, it is interesting to note that the increased incidence of depression sometimes reported during dieting (Stunkard & Rush, 1974) may be related to a central excitatory neural system. Two of the primary symptoms of depression are loss of appetite and retardation (Noble & Lader, 1972) of motor activity. Feeding may be an adaptive counter-response to depression and eating may restore central catecholaminergic

activity to some optimal level (Stricker, 1978). Polivy and Herman (1976) showed that when subjects high on restraint become depressed, they gained weight. They speculated that emotions will disrupt the chronic self-control of the restrained eater, increasing consumption.

Stricker (1978) spectulated that in humans, genetic factors and post-natal feeding are related to obesity. On the basis of existing evidence, long-term stingent dieting may be an additional cause. Stricker hypth-esizes that obesity in some people may be due to attempts to optimize general activation level by taking advantage of the stimulating properties of the sensory qualities of food and the sedative effects of food ingestion

(2) Predictability of access to food. Research supports the finding that predictability of access or regularity of food reduces hunger, making it manageable. This may well be among the most important accomplishments of behavioural treatments, enhancing weight maintenance and more rapid weight loss.

(3) Compensation. There appears to be increased failure to respond to internal signals when people restrict caloric intake. There appears to be two types, firstly a failure of satiety and secondly an unstable inhibition of appetite. In the first case, some factor such as rapid removal of nutrients from the system may prevent normal satiety and produce overeating (Booth, 1979; Powley, 1977; Stricker, 1978). In the second case, the failure of regulation appears to be a direct effect of caloric restrict-ion that may correct itself on refeeding unless, as seems likely, this brings with it a failure of satiety.

(4) Sensory Qualities. There also appears to be a heightening of the influence of innate and acquired reactions to the sensory qualities of food by caloric restriction. Investigations by Bosth (1972) suggest that these characteristics may be related to dieting history, rather than to a primary defect. These findings may support the general utility of stimulus control procedures that limit availability of palatable foods, at least

during periods of weight loss. It also suggests that perhaps these procedures should be phased out during refeeding, so that high palatability does not continue to be paired with eating at the high levels of hunger that typically lead to diet breaking, thereby perpetuating learned preferences for rich foods.

(iv) Summary

Behavioural treatments of obesity have produced weight losses as good or better than most previous forms of outpatient treatment, with clearly superior maintenance of results. However, permanent losses still tend to be small. Reasons for this include the difficulties in reducing the essentially normal food intakes of many subjects, the marked decreases in energy expenditure associated with dieting, with lowering of BMR, and bias towards storage during the refeeding period. Hunger during caloric restriction is related by an inverted crave to the degree of restriction, and inversely proportional to the predictability of food availability. Hunger can be suppressed but at the cost of suppression of activity. During deprivation, caloric sensing mechanisms are impaired and there is a heightened responsivity to diet palatability, which seems partially dependent on innate mechanisms and partly due to preference/aversion learning.

It appears that for some patients, failure of satiety has a physiological basis related to constitutional factors and possibly to the long-term effects of stringent dieting on metabolism. Classification of patients into those with and without excessive hunger and characterized by high and low general arousal levels allows predictions of response to treatment and is consistent with new formulations emphasizing the interrelationship of activation of feeding and other behaviours.

4. ENERGY EXPENDITURE AND EXERCISE

Thompson, Jarvie, Lahey and Cureton (1982) take a detailed look at energy expenditure in terms of physiological differences and the effects of exercise.

a. Activity, Caloric Intake and Obesity

(i) Epidemiological data suggest a positive relation between inactivity and obesity. Although obesity is increasing in prevalence, calorie consumption has declined. This may be accounted for by a reduction in physical activity. Several investigators have noted that body fat and weight increase with age (Forbes and Reina, 1970; Montoye, Epstein & Kjelsberg, 1965; Parizkoua, 1977). Additional epidermiological evidence suggests that populations of several countries (Argentina, Denmark, Ireland) eat more but are less obese than the people of the United States (Chlouverakis, 1975).

(ii) Observational and experimental research on energy intake have accumulated evidence that does not support the belief that overweight individuals generally consume more than do their leaner counterparts (Garrow, 1978a; Wooley et al., 1979). Research comparing obese and nonobese subjects in terms of activity levels has reported inconsistent findings. Comparisons across studies must be made with caution because of the many different measures of activity used. In addition, most researchers did not convert direct measures of activity into caloric expenditure figures. As Brownell and Stunkard (1980) pointed out, lower activity levels among the obese may not represent lower levels of energy output because activity in the obese entails a greater caloric cost than similar activity in people of normal weight. There is also a problem concerning the sampling of obese and normal weight subjects in such studies. Most researchers do not control for degree of obesity (total body weight or percent of body fat) or compare individuals in periods of static or dynamic weight gain. Thus, it is difficult to evaluate the exact role of physical activity in the develop-

ment of obesity. More stingent long-term comparisons using sophisticated activity measures are needed (Garrow, 1978a).

b. Physiological Effects of Physical Activity

(i) In terms of caloric intake, appetite and physical activity studies by Mayer (1956) and Epstein, Wing and Thompson (1978) suggest a small lowering of consumption unless activity is beyond the moderate range.

(ii) Activity and metabolic rate.

(a) The direct effect of exercise consists of an increase in energy expenditure during the actual activity. In addition, several studies have shown that exercise produces an increase in metabolic rate that outlasts the actual duration of the activity. This extra expenditure may have a significant effect on the total energy cost of the activity. Studies show a wide variability in reported expenditures. This is primarily due to the variability across studies in the exercise task. Differences in measurement procedures may have had some effect on the discrepencies. The relative effects of an individual's body composition (fat vs muscle), weight status (obese or nonobese), and fitness level (trained vs untrained) on post-exercise metabolic expenditure have not been analysed.

(b) Some researchers have suggested that exercise may counter the lowering of BMR caused by dietary restriction (Bray, 1979; Brownell & Stunkard, 1980; Mayer, 1968; Nelson, 1978; Schener & Tipton, 1977; Van Ilallic, 1978). However, adequate data supporting this contention is still lacking. The physiological rationale for the arguement is convincing, activity does increase metabolic rate and evidence strongly suggests a carryover effect. As reviewed by Apfelbaum (1978), however, dieting also decreased the energy cost of a specific task. Thus, it is probable that activity elevates BMR during caloric restriction but not to the degree that it would in normal intake periods. Whether the

increase would make a significant contribution to expenditure remains to be determined.

(c) Dietary-induced thermogenesis refers to the increase in metabolic rate following and resulting from the ingestion of food. Conflicting evidence exists on the question of whether obese people have a lower response to caloric intake than do normal weight individuals. However, the data suggest that obese individuals may have a lower resting and a lower exercise-induced thermic response to food ingestion. Janes and Trayburn (1981) posited that a decreased thermic response in the obese may be a result of metabolic abnormalities in brown adipose tissue.

(iii) Total body weight has traditionally been used to define obesity and has also served as the primary dependent variable in weight control research. Measures of body fat and lean body mass (LBM) are now accepted as more accurate criteria for defining obesity and for determining the efficacy of a weight control intervention (Katch & McArdle, 1977; Rogers et al. 1980). Exercise has been shown consistently to increase LBM and decrease body fat (Parizkova, 1977), and the relative changes in these variables have direct implications for metabolic rate and energy expenditure. Increases in body fat levels occur in two ways: enlargement of existing fat cells (Hypertrophy) and increases in the number of fat cells (Hyperplasia). Adiposity in the obese individual may be characterised by one or both of these factors (Hirtch & Batchelor, 1976; Salans, 1981). Exercise, however, may benefit individuals with enlarged fat cells but have little or no effect on those with an excess number of cells. Bjorntop (1978) demonstrated that individuals with hyperplatic obesity show minimal decreases in body fat after an exercise programme. Thus, individuals with moderate obesity resulting from enlarged fat cells are best suited for exercise training.

Several lines of data suggest that LBM is importantly related to metabolic rate and thus, to energy expenditure. Specifically LBM has been

shown to be approximately three times as active metabolically as fat tissue (Noack, 1977). Age and sex are important variables in metabolic rate and LBM. A large body of research has accumulated suggesting that activity is highly related to increases in LBM for both sexes at all ages (Bjorntorp, 1974, 1976, 1978; Hollosxy, 1973; Parazkova, 1973, 1977; Wilmore, 1973).

Summary

To summarize, firstly inactivity appears to be associated with obesity. In terms of energy intake or eating styles, differences between obese and nonobese are not supported. Comparisons in terms of activity levels have been inconsistent, however, there are a number of methodological problems in measurement of activity, of energy expenditure and in sampling of subjects. Secondly, it would appear that moderate exercise depresses appetite. Furthermore, metabolic effects of exercise may make a signficant contribution to energy expenditure. First, exercise produces energy output through a direct effect on metabolic rate during the activity and an indirect effect subsequent to the activity. Thirdly, exercise may aleviate dietary-reduced BMR, thus countering the negative metabolic effects of caloric restriction. Fourthly, contradictory data exist on the effects of exercise on dietary induced thermogenesis. Exercise may potentiate this effect in normal weight subjects, but not in obese individuals. Research is only beginning to delineate the various metabolic factors that are operative during exercise. Data on body composition indicate that body fat and LBM are important factors in the consideration of exercise for weight control. For instance, measures of type of fat (hyperplastic vs hypertrophic) may help promote optimal selection of treatment strategies. Individuals of moderate obesity with enlarged fat cells, may respond most favourably to an exercise intervention (Bjorntorp, 1979). In addition, exercise decreases stored fat rather than LBM, whereas dietary interventions tend to reduce both variables. Finally, the association between LBM and BMR

is consistent, and attempts to increase LBM may counter the lowering of BMR that is associated with age and dieting. Research designed to measure BMR and concurrent changes in LBM and body fat type is needed.

It is unfortunate that the management of obesity has not been guided by a knowledge of its physiology. Researchers have extensively used caloric restriction as an intervention even through the body's adaptive lowering of expenditure during food deprivation is an established fact of energy balance (Benedict et al., 1919; Garrow, 1978a). The rejection of exercise as a valid treatment has resulted from a narrow focus on its immediate role in energy expenditure to the exclusion of other relevant metabolic and physiological changes that accompany training.

Research is just beginning to unravel specific energy balance systems involved in the development and maintenance of obesity. The successful prevention and treatment of obesity are dependent on an understanding of these mechanisms and the incorporation of this knowledge into intervention strategies.

To conclude, firstly the role of activity level and caloric intake in the development of obesity is currently unclear because of the methodological limitations of past research. Methodological problems with past exercise treatment studies include failure to use body composition measures as dependent variables, to report specifics regarding exercise tasks and participation rates, and to divide subjects into homogenoous populations based on qualitative aspects of body fat type.

Secondly, the effects of exercise on caloric intake, metablolic rate and body composition have a significant effect on energy expenditure. Lastly, tentative evidence suggests that exercise in conjunction with other treatments produces greater weight loss than do single intervention procedures.

CHAPTER II

METHODOLOGY

1. Aims and Rationale

In this study the theoretical construct self-efficacy is tested with the view that it may have important implications for weight loss and also in terms of relapse and consequent weight gain. It is important that the question of self-efficacy and its relationship to weight loss and relapse be looked at for a number of reasons. The literature relating to obesity suggests that weight loss per se is not the difficult issue, rather it is the maintenance of this loss that appears to present problems. However, the concept of maintenance of behavioural gains generally has been neglected. With reference to the present study, if weight loss is accompanied by an increase in self-efficacy and this self-efficacy remains constant then it may be an important component of maintenance.

Self-efficacy theory proposes that given adequate skills and incentives, expectations of personal efficacy determine:

(i) whether coping behaviour will be initiated

(ii) whether it will be sustained in the face of difficulties, and

(iii) the degree of energy put into coping (Bandura, 1977).

Support for this construct has mainly come from work with phobics and with smoking behaviour, as well as a variety of other specific areas. There appears to be only one study (Chambliss and Murray, 1979) which looks particularly at weight loss and self-efficacy. This study used Rotter's (1966) Locus of Control as a measure of self-efficacy, which is a more generalized expectancy than that which Bandura proposes. However, in view of the importance of self-efficacy in the instigation and maintenance of other behaviour changes, especially smoking, it is quite probable that the term can be usefully applied to weight loss (Di Clemente, 1981).

According to Bandura's (1977) theory, informa on concerning expect-

ations of personal efficacy comes from four sources; (i) performance accomplishments, (ii) vicarous experience, (iii) verbal persuasion, (iv) physiological states. The more dependable the source, the greater the change in self-efficacy. Experiments show that the higher the level of self-efficacy, the higher the performance accomplishments and the lower the emotional arousal. In addition, the more varied the circumstances in which threats are mastered independently, the more likely are success experiences to increase self-efficacy and to insulate one from falling into patterns of negative self-perceptions in the face of failure. Thus, in terms of this study those who actually lose weight, that is, have a performance accomplishment, should score higher in terms of self-efficacy than those getting information about personal efficacy from any of the other sources.

If self-efficacy is, as Bandura claims, a better predictor of behaviour than past performance (our best measure so far) then this has important theoretical implications. Research has shown that cognitive processes play a prominant role in the acquisition and retention of new behaviour patterns. In addition, reinterpretation of antecedent determinants as predictive cues, rather than as controlling stimuli, has shifted the focus of the regulation of behaviour from the stimulus to the individual. Thus conceptualizing learning and motivation in terms of cognitive processes has implications for the mechanisms through which treatment procedures alter behavioural functioning (Bandura, 1977). Such implications extend to treatment in the present study with regard to both initial weight loss and maintenance.

In looking at the relationship between self-efficacy and weight loss, a questionnaire was devised from which self-efficacy could be measured. This in itself is important as there has not previously been a questionnaire constructed measuring self-efficacy in relation to eating behaviour. This can be used as a base from which other questionnaires on this topic can be formulated. Although intended to be sensitive to the individual's difficulties in coping, the questionnaire may reveal some common specific

areas amongst subjects in which coping is problematic. Emphasis on these areas may provide useful information from which coping strategies may be devised and directed at these recurrent situations or emotional states.

There are a number of specific aims that have been formulated for this study:

i. To compare a number of groups in terms of their self-efficacy score. Specifically these groups are:

(1) Overweight women who want to lose weight.

(2) Successful weight-watchers.

Additionally a student population divided into three sections:

(3) Within 10% of ideal body weight without restricting or controlling food intake.

(4) Within 10% of ideal body weight and remain so by restricting or controlling food intake.

(5) Not within 10% of ideal body weight.

The rationale behind these comparisons is to increase both the validity and reliability of the questionnaire. By looking at contrasting samples, a heterogenous group of people is obtained. This means that if there are differences between groups that it reflects a genuine variation between people rather than error variance. It is important to compare these three groups as if they do not differ on initial scores then this may mean that confidence is not related to a weight problem. The reason for dividing the student population into three sections is that it may further clarify differences in sectors of the populations and thus, for reasons discussed above, will add to the validity and reliability of the questionnaire.

(ii) To look at subjects self-efficacy score for all three groups and see how scores on Rotter's (1966) locus of control questionnaire covary. (Are high self-efficacy scorers more likely to be

Internals or Externals?). The rationale behind this comes from a study done by Chambliss and Murray (1979) which showed that an efficacy manipulation interacted significantly with locus of control, with the self-efficacy communication having a dramatic effect in Internals and very little effect on Externals. Thus, they conclude that a weight reduction program designed to increase self-efficacy beliefs is quite successful with Internal subjects, but unsuccessful with External subjects. In relation to this study, Rotter's (1966) locus of control score may be used with the women in the major part of the study to predict which will respond best to treatment. Subsequently, the actual outcome can be compared with the initial prediction.

(iii) To look at responses on the questionnaire, on an item level, to see if high risk situations can be identified and to see if there is a common conceptual thread in items that are characteristic of a particular group. This is very helpful in suggesting areas for treatment.

(iv) To divide self-efficacy into components of temptation and confidence to see if this adds to understanding differences between groups.

(v) To evaluate the usefulness of self-efficacy as a predictor of response to treatment and as a predictor of response in follow-up.

(vi) To see if weight loss is associated with an increase in self-efficacy.

(vii) To compare a measure of a person's self-efficacy before and after treatment through the weight control group.

(viii) To look at subjects at monthly intervals, via the questionnaire, to see if weight loss is maintained or not and how self-efficacy measures relate to this (if there is weight loss, is an increase in self-efficacy also maintained? If there is relapse, does this correspond to a decrease in self-efficacy?)

(ix) To look at confidence and temptation components over monthly intervals and see how weight corresponds. To assess whether this is a useful way of attempting to describe the weight loss process.

2. Subject Characteristics

Four different groups of subjects were used and can be described as follows:

(i) Pilot Questionnaire Subjects.

The first part of the research involved a pilot questionnaire (refer to Appendix 1) which was given to 59 subjects selected because of their attendance at Weight Watchers meetings. It was not considered necessary to note any other characteristics of these subjects.

(ii) Major Group of Women Studied

The subjects that formed the major part of the study were 12 women, all of whom wanted to lose weight and who had enrolled in a weight control group at the Papanui Medical Centre. All subjects had found out about the group from their doctors, who were members of the medical center and who had advised them to join the group. Many had been prompted by their doctors to lose weight to help ease medical problems such as high blood pressure or back problems. Before they started the group, all 12 women were given an initial inverview (refer to Appendix 2) and, in addition, a Self-Efficacy Questionnaire (refer to Appendix 3) and Rotter's (1966) locus of control Questionnaire (refer to Appendix 4). The initial interview was to assess whether each person would be acceptable as part of the study and to gather information pertaining to subject characteristics. The following criteria were to be used to exclude potential subjects from the study:

(a) a metabolic or organic disorder which causes them to be overweight

(b) extreme depressive symptoms

(c) extreme stress within the family or work

However, none of the women fulfilled these criteria and all 12 interviewed remained as part of the study. In follow-up, data for only one women proved difficult to obtain with three questionnaires not being completed. For another two women, one questionnaire was missed out due to reasons beyond the researcher's control. However, for nine women, data-collection was completed. The demographic data were as follows:

The age of the twelve women ranged between 22 and 64 years, with a mean overall age of 37 years. Education ranged from one year at secondary school to a B.A., with an average of three years at secondary school. Four of the women had completed high school and had continued on to a tertiary eduation institution. Of the twelve women all described themselved as performing duties within the home and family. Two women worked part-time as well. All were married and one of the women was separated from her husband.

As to nationality, ten were New Zealanders, with one American and one Niuean women. Nationality was recorded as it was thought that different societies differ in their attitudes to food and weight and that this may be reflected in how these women coped with their weight and in difficulties trying to lose it. Data on weight-control history revealed the following: The length of time these women had been overwight ranged from 3 to 20 years, with a mean of 11.8 years. All but two of the women had lost a lot of weight previously, however these two women had been overweight for relatively long periods of time, specifically, 14 and 19 years. One of these women was of Niuean nationality and this appeared to be significant in the way she related to food.

The range of how much overweight these women were was from 7.5 kg to 39.5 kg, with an overall mean of 18 kg. How much overweight each woman was was calculated by subtracting their goal weight from their actual weight. Goal weights varied quite a lot depending on the particular person and how slim she wanted to be. Percentage overweight was determined by looking at the height and weight of each individual and referring to a table of

previously calculated percentages (refer to Appendix 5). Percentage overweight ranged from 17.5 to 65 with a mean of 44.5%. Most of the women had tried some methods to try and lose weight. All but one had tried cutting down their food intake. Six of the twelve had been to Weight Watchers groups and one to a Kilo Club also. Other methods used involved diets from doctors, writing down everything that was eaten, exercising, fasting, and in two cases, prescribed diet pills from doctors. Data on general health revealed that five of the twelve women were taking some sort of medication and in two of these cases the medication was likely to affect their weight.

Stress levels ranged from mild to moderate, with one women between the moderate and several categories stress levels were assessed by looking at recent changes in residence, occupation, people lived with, close friends, responsibilities, and financial situation. In addition, the amount of worry or psychological pressure, as verbally expressed by each woman, in relation to what was happening in their lives was taken into account.

(iii) Successful Weight Watcher Group

The characteristics that the 18 subjects in this group had in common were that they had successfully lost weight through Weight Watchers and had maintained that loss for a number of years. Many were lecturers for Weight Watchers groups. Subjects in this group were given the Self-Efficacy Questionnaire and Rotter's (1966) locus of control Questionnaire. No other data on the subject characteristics for this group were noted.

(iv) Psychology Students

The last group of subjects comprised 34 Stage One Psychology students, this being their common characteristic. This group was administered the Self-Efficacy Questionnaire, Rotter's (1966) Locus of Control Questionnaire and the Eating Behaviour Questionnaire (refer to Appendix 7).

3. Experimental Design

Experimental design for the study can be divided into two sections.

The first section concerns the women who were part of the treatment and whose responses were looked at in depth over five months. The second section concerns the different groups of people used, for which only one set of responses were gathered.

Concerning the main part of the study, the intensive study of a small number of women, the experimental design is of the pretest/posttest type with repeated measures (Cook and Campbell, 1979). It can be diagrammed as:

$$O_1 \; X \; O_2 \; X \; O_3 \; O_4 \; O_5 \; O_6$$

Pretest observations (O_1) were recorded on a single group of women who later received treatment (X), during which another set of responses were collected (O_2) and after which posttest observations were made (O_3). Follow-up responses completed the study (O_4, O_5, O_6).

This part of the study was within subjects' comparison where each subject acted as her own control. Investigation was centered around change over time for a particular individual.

The second part of the study concerned a comparison between a number of groups, diagramatically represented as:

G_1

G_2

G_3
G_4
G_5

Responses to the same questionnaires were given to all five groups. An additional questionnaire was administered to G_3, G_4, and G_5 allowing subdivision of this student group and permitting comparisons.

4. Data Collection Instruments

Data were obtained by means of the following instruments:

(i) Pilot Questionnaire (refer to Appendix 1)

This questionnaire consisted of 59 items. These items described situations and mood states in which it would be likely that people would eat. A five point Likert Scale was used to measure how important each item was to the person while trying to lose weight. On the Likert Scale (1) was extremely important, (2) was very important, (3) moderately important, (4) was not very important, and (5) not at all important. The purpose of this questionnaire was to use the results to create a smaller questionnaire in which items that were not so important while trying to lose weight were not included in the final selection.

(ii) Initial Interview Sheet (refer to Appendix 2)

This questionnaire was used to gather information on basic demographic factors such as age, sex, education, occupation, marital status and nationality of each subject. Additionally, information was obtained on weight control history, looking at when the person became overweight, how long they had been trying to diet, what types of things they had tried and when, how much overweight they were, and if they had ever lost a lot of weight before. Lastly, general health and levels of stress as determined by recent changes in one's life, concerning residence, occupation, people lived with, close friends, responsibilities, financial situation, and one's internal state regarding stress felt, were assessed. One the basis of this data each subject was either included or excluded from the study.

(iii) Self-Efficacy Questionnaire (refer to Appendix 3)

This questionnaire consisted of 40 items and was based on the results obtained from the pilot questionnaire. It was to be used as a measure of self-efficacy for the major part of the study. The questionnaire involved differing intensity levels of varying emotional states and a variety of situations which were eating related. These seemed to satisfy the criteria of magnitude and generality as discussed by Bandura (1977). Subjects were to rate these items on how tempted they would be to eat in

this situation and how confident they would be that they would resist eating in this situation. The measure of temptation and of confidence was taken on a five point Likert Scale ranging from (1) not at all, (2), not very, (3) moderately, (4) very, and (5) extremely. The Likert response format was designed to satisfy the criterion of strength of expectancy and gave the subjects some latitude to express the strength of their own expectations. Ratings of the subjects for each of the 40 events were looked at individually and were also summed to yield a single self-efficacy score reflecting the global sense of efficacy of each subject regarding his or her ability to avoid inappropriate eating.

(iv) Rotter's (1966) Locus of Control Questionnaire (refer to Appendix 4)

This questionnaire consisted of 29 items and was a forced choice test containing two options for each question. Six filler items were included and these were intended to make the purpose of the test more ambiguous. The items dealt with the subject's belief about the nature of the world and concerned the subject's expectations about how reinforcement is controlled. The test is considered to be a measure of generalized expectancy. The letter preceeding the external choice in every item is italicized. The score is the total number of external choices (Rotter, 1966).

(v) Post-Treatment Evaluation Sheet (refer to Appendix 6)

This information sheet consisted of nine questions designed to evaluate whether or not the weight control groups were worthwhile and how to improve them. It attempted to assess aspects of the group that were helpful, the sort of changes it lead to personally, in terms of lifestyle, in eating habits and socially. Other areas considered the sorts of alternative strategies developed instead of eating, what the group lead onto in terms of involvement with other weight control related agencies, the differences between this group and other weight control groups that may have been attended, or improvements that could be made, and whether or not they had

lost weight and maintained that loss.

(vi) Eating Behaviour Questionnaire (refer to Appendix 7)

This questionnaire was designed to place subjects in one of the following three groups:

G3 Within 10% of ideal body weight and no not control or restrict food intake

G4 Within 10% of ideal body weight but remain so by restricting or controlling food intake

G5 Not within 10% of ideal body weight

Ideal body weight was determined by the subject him/herself. This questionnaire attempted to distinguish sectors of what may have appeared to be a homogenous group, thus increasing the validity and reliability of the questionnaire.

5. Weight Control Group

The purpose of the weight control groups was to initiate a gradual change in the lifestyle and eating habits of the participants. The programme was not designed to produce dramatic changes. In addition, it was hoped that an awareness of why they were eating would arise. The groups were conducted at the Papanui Medical Center by a social worker in conjunction with the researcher. The groups were one and a quarter hours duration, once a week for eight weeks. Each member was weighed at the beginning of each session. Progression through each week was as follows:

WEEK 1 In this session a brief outline of the course was presented. Each person introduced themself and told the group briefly about themselves and why they had decided to join the group. The aim of this was so that people could get to know each other and to encourage the members to trust one another and feel free to express themselves. Confidentiality was emphasized. Each person was given handouts (refer to

Appendices 8, 9, 10) about nutrition and modern food groups for good health. Included in this was information on good food choices and quantities for weight loss. Personal responsibility and control was emphasized and stress placed on non-competitiveness. Each person was asked to start a food diary which consisted of a record of all food eaten each day. Recording the food diary was to continue throughout the course.

WEEK 2 The second week consisted primarily of a discussion about nutrition and motivation to lose weight. It was emphasized that diet is an integral part of one's lifestyle and the question was asked "Does it imply too much change in your current lifestyle?" For each person the sort of changes that would need to be made was assessed. Food diaries were gone over individually with constructive comments for change. In each session time was allocated for this review and evaluation. A handout on motivation looking at how much one wanted to lose weight (refer to Appendix 11) was given to members to fill in at home and to think about over the week.

WEEK 3 The third week looked at diet and lifestyle. The motivation questionnaire members had filled in during the week was discussed. At this stage it was useful to begin to explore feelings involved, with the focus on "Do you <u>really</u> want to do something?" The idea of self-image was explored. Possibilities concerning exercise were discussed. Each person was asked to set a specific goal for themselves regarding some change in their current lifestyle that they would work towards over the coming week. Handouts were given

out which were relevant for the following week so that people could consider what they involved and get some ideas for discusssion. The handouts looked at behaviour modification techniques regarding food handling, eating behaviour, and stimulus control (refer to Appendices 12, 13, 14, 15).

WEEK 4 The fourth week concentrated on a discussion of principles of behaviour modification. In particular, it looked at how eating, food handling and food buying can be changed by this means. Each person decided on a goal, concentrating on changing a particular behaviour during the week. Over the coming week members were asked to think about rewards for behaviour change. Members were also required to bring a photograph of themselves when they were young for the following session.

WEEK 5 In the fifth session discussion centred around each person's photograph of herself. Things that were looked at where why that particular photograph was chosen, how old each person was at the time, where it was taken, who they were with, and what their feelings were about the photograph. The aim was to get some insight into ideas and feelings that formed current feelings about body image, food habits and other's reactions to one. This involved looking at the sorts of messages one received as a child and making the link between these messages and getting fat. There was a stress on challenging these ideas and feelings in terms of their power over behaviour in the present. Again a goal was set for each person as to what they wanted to emphasize or continue emphasizing in the coming week. Members were asked to think

about what they had learnt about themselves over the coming week.

WEEK 6 The sixth session involved a fatness/thinness fantasy. Members were asked to relax and imagine themselves at two different parties, one at which they were fat, and one at which they were thin. The fantasy focused on what they would wear, their thoughts, positive and negative, about the forthcoming event, their confidence in themselves at the party, and what they ate. A group discussion about how people felt about being relaxed and about what each person found out about their feelings and ideas in each of the fantasies and how they differed in each one followed. Goals for the coming week were set.

WEEK 7 The seventh week involved a discussion about self-efficacy and what it meant in terms of trying to change behaviour. In addition, a questionnaire about life situations in which the need to eat may occur was looked at. Each person considered which situations particularly affected them and how they could change (refer to Appendices 3, 16). Thinking positively was stresssed and becoming aware of negative feedback such as "I won't be able to do it" was covered. Goals about behaviour for the forthcoming week were set. In preparation for the last session, members were asked to write a short list of good reasons to be fat and good reasons to be thin. In addition, they were to list five things they liked about themselves now and to consider whether or not they would change if they lost weight.

WEEK 8 The last session discussed good reasons for being both fat and thin and the things people liked about themselves. It looked at the stage each person felt they were at, and where they could go from here. There was discussion on what members felt they had gained from the group and on what they had expected.

6. Procedure

The procedural aspects of the study can be divided into three stages. The first involved the Self-Efficacy Questionnaire; the second, the major group of women studied and the treatment phase; and thirdly, additional groups whose responses were collected.

(i) Self Efficacy Questionnaire

Since there was no questionnaire relating to self-efficacy and weight, the first task was to design a questionnaire and test it by way of a pilot study. Drawing on personal experience, friends with whom the researcher discussed experiences of trying to lose weight, talking with the area manager of Weight Watchers and getting some ideas from self-efficacy questionnaires on smoking (Condiotte & Lichtenstein, 1981; Di Dlemente, 1981), 59 items were generated, together forming the pilot questionnaire. These items described situations and emotional states in which eating behaviour would be likely.

The area manager of Weight Watchers was approached and after explaining the research and what was hoped would be achieved by it, consent was given for the researcher to administer the pilot questionnaire to persons attending Weight Watchers meetings. The purpose of the study and the need for the pilot study was explained to the people present at these meetings. If they decided to take part in the study they filled in the questionnaire (refer to Appendix 1). In deciding which items would remain as part of the main questionnaire, those items who most rated as "not important at all" or "not very important" (5 and 4 respectively, on the scale) were excluded.

The assumption behind this was that if people encountering problems in controlling food intake did not experience difficulties in these situations or mood states, then it was not necessary to assess them. Thus, the Self-Efficacy Questionnaire consisted of 40 items, with a response format to assess not only subjects' confidence to resist eating, but also their temptation to eat in each situation (cue strength) in order to examine more thoroughly how these related to weight loss and maintenance.

(ii) Main Group of Women with Treatment

The subjects that were involved in the major part of the study were obtained through the Papanui Medical Center. The rationale and aims of the study were presented to members of the medical centre. Also outlined was how the research would be conducted and to what extent the subjects would be involved. Subsequently, two weight control groups of six women each were run. A social worker who was part of the centre ran the groups with the assistance of the researcher.

All the twelve women were contacted first by a letter in the mail prior to enrolling for the group. The letter told them about the group, the time and dates on which the group would meet, and that an evaluation was being done by the researcher. They were told that if they enrolled they would be contacted by phone by the researcher who would be asking them to fill in some questionnaires. A week before the group started, the women who had enrolled were contacted and a time was arranged when the researcher would go to their home. During this first visit (about an hour long) the purpose of the study was explained and the cooperation of the subject was asked for. It was outlined that they would fill in six lots of questionnaires at monthly intervals. For the first two they would receive the Self-Efficacy Questionnaire and Rotter's (1966) locus of control Questionnaire. In the months following it would be only the Self-Efficacy Questionnaire they would be asked to fill in. In the first visit these two questionnaires were

administered after an initial interview which established whether or not they fulfilled criteria making them suitable to participate in the study. All were accepted.

The treatment phase involving the weight control groups took place at this stage with pre-, mid-, and post-treatment questionnaires being administered. A performance measure of weight was taken in conjunction with each of these administrations. There was a monthly follow-up of three months after the groups had finished.

An evaluation sheet (refer to Appendix 6) was designed and sent through the Papanui Medical Centre to each participant in which they were asked to appraise the group. This was to assess the usefulness of the group in relation to other weight loss agencies and to help in planning future groups. Once this section of the data collection was completed, information was collected from two more sources.

(iii) Additional Groups

Responses from two additional groups were obtained. The first involved Weight Watchers members. By permission of the area manager of Weight Watchers, the researcher was able to administer the Self-Efficacy Questionnaire and Rotter's (1966) Locus of Control Questionnaire to 18 successful Weight Watchers. The second group were 34 Stage One Psychology students. In addition to the Self-Efficacy Questionnaire, these subjects were administered an Eating Behaviour Questionnaire which placed each subject in one of three groups. This was to allow more thorough comparisons to be made.

CHAPTER III

RESULTS

The results are presented in three sections. In the first section, the question examined is whether the questionnaire differentiates between all groups in terms of their self-efficacy scores and their locus of control scores. Also of importance is the identification of any relationship between self-efficacy and locus of control. Statistics used to examine this were chi square Pearson's product moment correlations and the Wilcox test.

The second section provides a more detailed investigation of the self-efficacy scores. Using a discriminant analysis, the specific items that make up the self-efficacy score were identified for each of the groups. A discriminant analysis takes the most significant variables and enters it into the equation first. It then readjusts the variance of all the other variables so they are uncontaminated. It continues doing this until it has a final set of variables. These variables represent the items on the self-efficacy questionnaire that account for most of the variance between groups. Firstly, confidence items are discriminated, then temptation and, thirdly a combination of the confidence and temptation items. The discriminant analysis also provides information about the usefulness of the questionnaire as a measure that distinguishes between groups of people identifying specific items provides descriptive data on the groups as well as data on aspects that may be useful in treatment. It also allows definition of the most important items in the questionnaire, providing a base from which to re-construct a more precise instrument.

The third section looks at the women in Group One who went through the treatment programme. Correlations and analysis of variance were used to look at the relationship between weight and self-efficacy, comparing pretest, treatment and follow-up phases. Additionally, each of the data

points for each individual subject were divided into high or low for confidence, temptation and weight loss. A chi squared analysis of these data points allowed a detailed examination of the relationship between rises and falls in self-efficacy and weight.

1. GROUP DIFFERENCES (Refer to Appendix 17)

(i) Self-Efficacy

All subjects in each of the five groups were divided into high or low self-efficacy. From a possible range of 80 to 400, a high score was defined as one above 240, while a low score was 240 or below. Results (refer to Table 1) showed that Groups one (overweight women who wanted to lose weight), three (within 10% of ideal body weight and do not restrict food intake),and four (within 10% of ideal body weight and remain so by restricting food intake) were all composed of significantly more subjects with low self-efficacy. Groups two (successful weight watchers), and five (not within 10% of ideal body weight) had equal numbers of high and low self-efficacy subjects (chi squared $p<.013$).

(ii) Locus of Control

All subjects in each of the five groups were divided into either internal or external on Rotter's (1966) locus of control measure. From a range of 0 to 23, an internal score was defined as one of 11 or below while an external score was one of 12 or above. Results (refer to Table 2) show that Group two (successful weight watchers) was composed of significantly more internals than externals (chi squared $p<.01$). Group five (not within 10% of ideal body weight) was composed of significantly more externals than internals (chi squared $p<.05$). The difference in frequency between these two groups was significant (chi squared $p<.05$). For Group one (overweight women who wanted to lose weight), there were not enough internals (n=5) to test the hypothesis that they control their weight better than externals. The composition, with respect to internals and externals, of both Groups three

Table 1 Self-Efficacy Scores

SELF-EFFICACY
No. of subjects in each category

	Low (240 & below)	High (Above 240)
Group 1	10	3
Group 2	9	9
Group 3	15	1
Group 4	8	3
Group 5	4	4

Table 2 Locus of Control Scores

LOCUS OF CONTROL
No. of subjects in each category

	Interval (11 or below)	External (12 or above)	
Group 1	5	7	N=12
Group 2	14 (78%)	4 (22%)	N=18
Group 3	9	7	N=16
Group 4	7	4	N=11
Group 5	2	6	N=8

(within 10% of ideal body weight and do not restrict food intake), and four (within 10% of ideal body weight and remain so by restricting food intake) were not significantly different.

(iii) Self-Efficacy and Locus of Control

Changes in self-efficacy showed no consistent relationship or pattern when compared with corresponding locus of control scores (Pearsons's Product Moment Correlation, Wilcox's tests, $p<.0$).

2. DISCRIMINANT ANALYSIS

(i) Confidence

Scores on confidence items, (refer to Tables 3 and 4) distinguish most clearly (66.57% variance) between Group two (successful weight watchers) and Group three (within 10% of ideal body weight and do not restrict food intake) (discriminant function $P<.001$). In terms of specific items that distinguish Group two from Group three (refer to Table 8) there does not appear to be a common conceptual thread describing the type of items that either group feel highly confident in attempts to resist food. To a lesser extent (17.70% variance) Group one (overweight women wno wanted to lose weight) had different responses on confidence items than did all the other four groups (discriminant function $P<.01$).

Collectively, the items that Group one scored low on appear to be times when people are by themselves rather than in social interaction with other people (refer to Table 5). The discriminant analysis shows the subjects who were not correctly classified according to their scores on the confidence items into the groups from which they originally came (refer to Table 6). While most subjects in each of the groups were correctly classified, for Group four (within 10% of ideal body weight but remain so by restricting food intake) most subjects were not correctly classified.

Table 3 Discriminant analysis on confidence items

Function	Percent of Variance	Cumulative Percent	Significance
1	66.57	66.57	0.0000
2	17.70	84.27	0.0187
3	10.30	94.57	0.1429
4	5.43	100.00	0.3429

Table 4 Groups discriminated between on confidence items

Canonical Discriminant Functions Evaluated at Group Means		
Group	Function 1	Function 2
1	-0.53227	-1.37737
2	1.86253	0.09954
3	-1.64060	0.45527
4	-0.28168	0.38612
5	0.31571	0.45787

TABLE 5 Specific confidence items distinguishing groups

FUNCTION 1 - Items that group 2 scored high on were:

C8 when I see that I am gaining weight

C28 when I feel I need more energy

C34 while I am drinking

C37 when I am trying to pass time.

- items that group 3 scored high on were:

C9 when I am extremely anxious or depressed

C31 when I feel restless and don't know what to do

C33 when I am clearing up leftovers after a meal.

FUNCTION 2 - Items that Group 1 scored high on were:

C29 when I am waiting for someone or something

C31 when I feel restless and don't know what to do with myself

C34 while I am drinking.

- items that the other groups scored high on were:

C8 when I see that I am gaining weight

C9 when I am extremely anxious or depressed

C25 when I want something in my mouth

C28 when I need more energy

C30 when I feel tired

C33 when I am cleaning up leftovers after a meal

C37 when I am trying to pass time.

TABLE 6 Classification into groups based on confidence scores

GROUP	NO. OF SUBJECTS IN GROUP	NO. OF SUBJECTS MISCLASSIFIED
1	12	2
2	16	4
3	18	4
4	11	8
5	7	3

(ii) Temptation

Scores on temptation items (refer to Tables 7 and 8), distinguish most clearly (41.70% variance) between Group three (within 10% of ideal body weight and do not restrict food intake) and all other groups (discriminant function P<.000). In terms of specific temptation items that distinguish Group three from all other groups, the latter tended to score high on items that were mood related on novel situations (refer to Table 9). Responses on temptation items also identified differences (38.80% variance) between Groups one and five and Groups two, three, and four (discriminant function p<.000). Those items that Groups one and five scored high on in comparison to the other groups tended to be bodily states and meal situations (refer to Table 9). Temptation items distinguished, to a lesser degree (14.17% variance) between Groups one (overweight women who wanted to lose weight) and Group five (not within 10% of ideal bodyweight)(discriminant function p<.05).

There did not appear to be a common conceptual timead in the specific items distinguishing Group one from Group five. In terms of subjects being correctly classified according to their scores on the temptation items (refer to Table 10), most subjects in all groups were correctly classified into the groups from which they previously came. Group four, while not being correctly classified as confidence items, was for temptation. Fewer subjects were mis-classified on their temptation score than on the confidence score.

(iii) Confidence and Temptation Combined

With these two components of self-efficacy combined (refer to Tables 11 and 12), the responses to items distinguished most clearly (48.52% variance) between Group two (successful weight watchers) and Group three (within 10% of ideal body weight and do not restrict food intake) (discriminant function p<.000). In terms of specific items that distinguish the groups from each

TABLE 7 Discriminant analysis on temptation items

CANONICAL DISCRIMINANT FUNCTIONS			
FUNCTION	PERCENT OF VARIANCE	CUMULATIVE PERCENT	SIGNIFICANCE
1	41.70	41.70	0.0000
2	38.80	80.50	0.0000
3	14.17	94.66	0.0594
4	5.34	100.00	0.04242

TABLE 8 Groups discriminated between on temptation items

CANONICAL DISCRIMINANT FUNCTIONS EVALUATED AT GROUP MEANS			
GROUP	FUNCTION 1	FUNCTION 2	FUNCTION 3
1	-0.82806	1.48134	0.95023
2	-0.98989	-1.27685	-0.04146
3	1.90182	-0.18547	0.19569
4	-0.9721	-0.35286	-0.28402
5	-0.22930	1.72236	-1.52332

TABLE 9 Specific temptation items distinguishing groups

FUNCTION 1	- Items that Group 3 scored high on were:
T35	When I am eating out at a friends place or a restaurant
T37	When I am trying to pass time
T40	On arriving home.
	- Items that the other groups scored high on were:
T9	When I am extremely anxious or depressed
T17	When I realize that dieting is an extremely difficult task for me
T38	When I am on holiday.
FUNCTION 2	- Items that Groups 1 and 5 scored high on were:
T14	When I really miss eating and am feeling hungry
T25	When I want something in my mouth
T27	When I feel tense or nervous
T33	When I am cleaning up leftovers after a meal
T39	When I am feeding the family
	- Items that Groups 2, 3 and 4 scored high on were:
T9	When I am extremely anxious or depressed
T38	When I am on holiday
T40	On arriving home
FUNCTION 3	- Items that Group 1 scored high on were:
T27	When I feel tense or nervous
T35	When I am eating out at a friend's place or a restaurant
T37	When I am trying to pass time
T39	When I am feeding the family
	- Items that Group 5 scored high on were:
T25	When I want something in my mouth
T33	When I am clearing up leftovers after a meal
T34	While I am drinking

TABLE 10 Classification into groups based on temptation scores

GROUP	NO. OF SUBJECTS IN GROUP	NO. OF SUBJECTS MISCLASSIFIED
1	12	4
2	16	4
3	18	2
4	11	2
5	7	0

TABLE 11 Discriminant analysis on temptation and confidence items

CANONICAL DISCRIMINANT FUNCTIONS			
FUNCTION	PERCENT OF VARIANCE	CUMULATIVE PERCENT	SIGNIFICANCE
1	48.52	48.52	0.0000
2	34.79	83.32	0.0000
3	10.27	93.58	0.0156
4	6.42	100.00	0.1311

TABLE 12 Groups discriminated between on temptation and confidence items

CANONICAL DISCRIMINANT FUNCTIONS EVALUATED AT GROUP MEANS			
GROUP	FUNCTION 1	FUNCTION 2	FUNCTION 3
1	-0.91990	2.27847	0.88484
2	-1.85376	-1.73552	-0.15160
3	2.91135	-0.58012	-0.03473
4	0.06182	-0.06962	0.64554
5	-0.40789	1.99222	-2.06209

other there does not appear to be a common conceptual thread that describes the type of items that particular groups feel highly confident to resist food or highly tempted to eat (refer to Table 13). To a lesser extent (34.79% variance) Groups one (overwight women who wanted to lose weight) and five (not within 10% of ideal body weight) had different responses on the items combined than did Group two (successful weight watchers) (discriminant function $p<.000$). This result is similar to that obtained with temptation items alone (38.80% variance). Collectively, Group one tended to score low in situations where they are alone (refer to Table 13). There were also some distinguishing responses (10.27% variance) between Group five (not within 10% of ideal body weight) and Group one (overweight women who want to lose weight) and four (within 10% of ideal body weight but remain so by restricting food intake) (discriminant function $p<.015$).

No common theme was identified in the items that distinguished these groups. In looking at the subjects who were not correctly classified, (refer to Table 14), the combination of confidence and temptation responses resulted in very few misclassifications.

3. GROUP ONE - TREATMENT GROUP

(i) Self-Efficacy, Weight and Treatment

The results showed that for these subjects (n=12), when self-efficacy increased then weight decreased and when self-efficacy decreased then weight increased (Pearson's Product Moment Correlation, $p<.02$). The questionnaire appears to be sensitive to differences between individuals (ANOVAS, $p<.001$). There was an overall improvement in self-efficacy during treatment (ANOVA, $F=10.557$, $p<.0001$) and this was maintaned to follow-up (ANOVA, $F=2.056$, $p<.04$). Overall most subjects evidenced weight loss during treatment (ANOVA, $F=452.642$, $p<.0001$ level). Weight loss maintenance and continuing losses in follow-up occurred for women who had lost 1 kg or more in treatment (n=8) (ANOVA, $F=2.9$, $p<.03$) but not for those who had not

TABLE 13 Specific temptation and confidence items distinguishing groups

FUNCTION 1 - Item that Group 2 scored high on were:

T38 when I am on holiday

C14 when I really miss eating and am feeling hungry

C34 when I am drinking

C37 when I am trying to pass time

- items that Group 3 scored high on were:

T4 when under pressure in my job

T40 on arriving home

C9 when I am extremely anxious and depressed

C31 when I feel restless and don't know what to do with myself.

FUNCTION 2 - Items that Groups 1 and 5 scored high on were:

T14 when I really miss eating and am feeling hungry

T26 when I want to cheer up

T33 when I am clearing up leftovers after a meal

C14 when I really miss eating and am feeling hungry

- items that Group 3 scored high on were:

T38 when I am on holiday

T40 on arriving home

C25 when I want something in my mouth

C30 when I feel tired

C34 when I am drinking.

FUNCTION 3 - Items that Group 5 scored high on were:

T29 when I am waiting for someone or something

C37 when I am trying to pass time

- items that Groups 1 and 4 scored high on were:

T38 when I am on holiday

C25 when I want something in my mouth.

TABLE 14 Classification into groups based on temptation and confidence scores

GROUP	NO. OF SUBJECTS IN GROUP	NO. OF SUBJECTS MISCLASSIFIED
1	12	1
2	16	2
3	18	1
4	11	1
5	7	0

reached this criteria (n=4).

(ii) Prediction

Of the twelve women, nine initially had a low self-efficacy score, and three a high score. The latter subjects lost weight consistently and mostly maintained a high score. At the end of treatment three women had high self-efficacy scores, two of which had showed high self-efficacy scores initially. Two of the women with high self-efficacy scores at the end of treatment continued to lose weight in follow-up with the other only showing minimal weight loss. The other nine subjects with low self-efficacy scores at the end of treatment varied with weight losses ranging from 11.5 kg to 1 kg above pretest. Prediction of weight loss on the basis of an initial high or low self-efficacy score was not possible due to the small sample size.

(iii) Temptation and Confidence Combined

The relationship between temptation and confidence vs. separate components of self-efficacy, and weight loss was examined at each point for each individual (refer to Appendix 18). Each of these three measures was divided into high or low scores. For temptation and confidence, from a possible range of 40 to 200, a high score was defined as 100 or above and a low score as below 100. A high weight loss was defined as one above .5 kg over pretest and a low weight loss as below .5 kg over pretest.

The sample was not big enough to be able to predict what will happen when temptation and confidence are high or low. However, there does appear to be a definite trend. Confidence and temptation seem to be very individual but a balance between the two, which is different for each person, seems to be important for weight loss to occur. For many of the women weight loss or gain can be seen in relation to rises and falls in confidence and temptation. It would appear that for the women who lost most weight

both temptation and confidence were high (Pearson's product movement correlation, $p<.39$). If one of these aspects changed the balance of the two was out and weight maintenance of gain often followed.

4. SUMMARY OF RESULTS

(a) It would appear that the self-efficacy questionnaire can distinguish a variety of populations on the basis of their self-efficacy score.

(b) Self-efficacy appears to measure something different from Locus of Control. Self-efficacy identified different groups with greater precision than did locus of control.

(c) The questionnaire seems valuable in suggesting high-risk situations on an item level which is useful in treatment programmes. Additionally, the questionnaire is a useful tool to measure changes in self-efficacy after treatment.

(d) Division of self-efficacy into components of temptation and confidence is helpful both in identifying groups and to investigate the process of weight loss in individuals.

(e) Prediction of which subjects will respond best to treatment based on initial self-efficacy scores and of who will do well in follow-up based on self-efficacy scores at the end of treatment did not prove useful with this group of women. However, the sample used here was small and may not be representative of all those who attend weight loss programmes.

(f) For this treatment group increased self-efficacy was matched by drops in weight, with both increases in self-efficacy and drops in weight being maintained in follow-up.

(g) The findings suggest a trend in which confidence and temptation scores vary between individuals but a balance between the two, which is different for each person, appears to be important for weight loss to occur. When this balance changed weight maintenance or gain often followed.

CHAPTER IV

DISCUSSION

1. GROUP DIFFERENCES

(i) Self-Efficacy

The finding that more subjects have low self-efficacy in Groups one, three and four, would suggest that Groups one (overweight women who want to lose weight) and four (within 10% of ideal body weight and remain so by restricting food intake) are both attempting to control food intake. For Group three (within 10% of ideal body weight and do not restrict food intake), weight would not appear to be a big problem and restriction not an issue for these subjects. If resisting food has no purpose, one could expect a low score on self-efficacy to characterise this group. Groups two (successful weight watchers) and five (not within 10% of ideal body weight) are high on self-efficacy. A common link between these two groups is that they are not seeking treatment.

(ii) Locus of Control

It would appear that internals (successful weight watchers) are more likely to control weight better than externals (not within 10% of ideal body weight). However, it is not known how many of the successful subjects were internal or external before they became successful. From this data one cannot make the prediction that internals respond better to treatment than externals, although some studies have found this to be the case (Chambliss and Murray, 1979b). Groups three and four were both within 10% of their body weight and did not evidence any more internal than external subjects.

(iii) Self-Efficacy and Locus of Control

The present results show that self-efficacy does test something

different from locus of control. These results do not agree with the only other study relating to self-efficacy and weight loss (Chambliss and Murray, 1979b). Their results showed that a weight reduction programme designed to increase self-efficacy beliefs was quite successful with internals but unseccessful with externals. The present investigation found no such relationship between the measures of self-efficacy and internality or externality. These findings reinforce Bandura's comments about self-efficacy and locus of control. Rotter's (1966) conceptual scheme is primarily concerned with causal beliefs about action-outcome contingencies rather than personal efficacy. Perceived self-efficacy and beliefs about the locus of causality must be distinguished because convictions that outcome are determined by one's own actions can have any number of effects on self-efficacy and behaviour (Bandura, 1977). That there is a difference between these two concepts is supported by the present results.

2. DISCRIMINANT ANALYSIS

A discriminant analysis is useful in looking more closely at what sorts of items identify different groups of people. By looking at the items collectively it is possible to suggest a unifying factor that aids interpretation. It is useful in specifying aspects that are helpful to focus on in treatment that will increase a person's self-efficacy in trying to lose weight. Additionally, it identifies the most important items in the questionnaire, thus aiding construction of a more concise and accurate questionnaire.

(i) Confidence

The most important distinction of responses to confidence items was between Group two (successful weight watchers) and Group three (within 10% of ideal body weight and do not restrict food intake). This finding suggests that there may be important differences between those who are successful at weight loss and those who appear to have no difficulty controlling their

weight. As there did not appear to be a common theme in the types of items characterizing each group, more specific identification of these differences is not possible. In obesity literature some studies have tried to change eating patterns of overweight individuals to those resembling average weight people. The present results suggest that those successful in weight loss may differ from average weight people regarding the types of situations and mood states each responds to by eating. Thus, as some research supports, creating such a similarity may not be a useful way to approach treatment.

The second most important distinction on the basis of responses to confidence items was between Group one (overweight women who wanted to lose weight) and all other groups. The items that Group one characteristically scored low on may be useful areas to focus on and look at alternatives to eating in such situations and mood states as part of treatment. More specifically, these results suggest that teaching people how to deal more effectively at times when they are alone may be an important aspect of treatment programmes.

In terms of responses to confidence items, most of the subjects in Group four (within 10% of ideal body weight but remain so by restricting food intake), were misclassified. There are a number of reasons why these people may have been categorized under a variety of other groups. Depending on the type of control these subjects used, their feelings of competence and body image in achieving control, they could have fallen into Group one, feeling like they wanted to lose weight; Group two, feeling successful; Group three, reasonably happy about their body and their control over food; or Group five, in conflict with their size.

(ii) Temptation

The most important distinction on responses to temptation items was between Group three (within 10% of ideal body weight and do not restrict food intake), and all other groups. Group three may be regarded as the only group

not interested in controlling food intake. Thus, it would appear that attempts to control intake are associated with higher temptation for food and this may be important to consider in weight loss programmes.

Looking at specific items that subjects in other groups scored low on, dealing with temptation in mood related or novel situations suggests a possible area for discussion.

The second most important distinction on the basis of responses to temptation items was between Groups one, and five, and Groups two, three, and four. This may be explained by the fact that Groups one and five were similar in that they are overweight and this differentiates them from Groups two, three, and four, who are all closer to their ideal body weight.

It would appear from these results that subjects who are overweight find food most tempting in relation to their bodily state and in meal situations. Again, these may provide important areas of discussion in a weight control programme.

A smaller distinction was made between Group one (overweight women who want to lose weight) and Group five (not within 10% of ideal body weight). The distinguishing factor here may be that Group one wants to lose weight and have become involved in treatment whereas this is unknown for Group five. No more specific differences can be suggested as there did not appear to be a common theme in the type of items each of these groups responded highly to. In terms of classification on responses to items, temptation items appear to result in fewer errors than classifications made on confidence items.

(iii) Confidence and Temptation Combined

The most important distinction on responses to confidence and temptation items combined was between Group five (successful weight watchers) and Group three (within 10% of ideal body weight and do not restrict food intake). As this same distinction was the most important made on confidence

items alone, similar reasons, as discussed previously, explain this result. The second most important distinction on the basis of combined responses to confidence and temptation items was between Group one (overweight women who want to lose weight), and Group two (successful weight watchers). The difference here appears to be subjects who attempt to control their weight and have done so and subjects still attempting to achieve control. The items that Group one scored low on provide suggestions for specific areas to cover in a weight loss programme. Situations in which people are by themselves appeared again as ones which are difficult to deal with.

A smaller distinction was made between Group five (not within 10% of ideal body weight) and Groups one (overweight women who want to lose weight) and four (within 10% of ideal body weight but remain so by restricting food intake). This may be accounted for by the fact that Groups one and four wanting to maintain or achieve control whereas this is not known for Group five. Although no common theme suggested specific differences between these groups, as before, those items which Group one scored low on may provide useful ideas for treatment programmes. The results of classification into groups on the basis of combined responses to confidence and temptation items show that considering both components of the self-efficacy score provide the most accurate method of identifying different groups of people.

(iv) Summary

It is apparent that for many of the items that distinguish the groups, there is no common conceptual underlying theme that links the items together. The specific items on their own are worth noting, although not necessarily related, do not really need to be related on a level beneath food. Possibly this suggests the presence of idiosyncratic triggers for eating.

Looking at self-efficacy in terms of components at an item level is helpful in discerning differences between groups and in identifying high risk situations for these in treatment. This analysis supports the useful-

ness of the questionnaire in its ability to distinguish groups accurately in terms of their expectations of personal control over resisting food. In addition, the items identified are those that bring out most differences between groups. Consideration of these items may enable the questionnaire length to be shortened to a more concise and accurate measuring instrument.

3. GROUP ONE - TREATMENT GROUP

(i) Self-efficacy and weight in treatment and follow-up

The hypothesis that rises and drops in weight are accompanied by respective drops and rises in self-efficacy was confirmed by this investigation. The questionnaire appears to distinguish not only between groups but between subjects and thus appears to be a sensitive measuring device in its ability to estimate self-efficacy expectations. Adequacy of measurement becomes a critical issue when one particular behaviour is studied which can occur in a wide range of settings triggered by a variety of cues. Treatment appears to improve self-efficacy and to reduce weight. The treatment was not specifically oriented to enhance self-efficacy and future research would need to assess whether a specific self-efficacy component would correspond with better weight losses.

The maintenance of both increases in self-efficacy and decreases in weight is supported by the treatment programme, however, further assessments are necessary to establish whether or not they are sustained over longer periods. In the past, researchers have found maintenance to be successful up to six months into follow-up, after which losses appear to slip. Maintenance of levels of self-efficacy has thus far not been evaluated long term by any researchers, although Di Clemente and Procheska (1981) are currently engaged in a three year longitudinal project assessing self-efficacy and the stages of self-change smoking.

(ii) Prediction

It was difficult to use self-efficacy as a predictor of success in the weight control programme due to small sample size. Although high pretest scorers lost weight consistently during treatment and in follow-up, many low scorers also lost and continued to lose weight throughout. Similarly scores at the end of treatment did not necessarily predict greatest losses in weight during follow-up. Numerous researchers have supported Bandura's statement that expectations of personal efficacy have predicted behaviour more reliably than past performance. In terms of weight loss the results of this study do not lead support to this notion, however, this may be due to methodological limitations in the study. Further research into the area of weight loss is needed to establish whether prediction on the basis of self-efficacy is accurate and useful.

(iii) Temptation, confidence and weight loss

Dividing weight loss into the separate, but not independent, components of temptation and confidence gives a better indication of the process of weight loss as it occurs. The findings of this study in approaching the process in this manner appear promising, although this far are only suggestive. Rather than absolute high or low scores, individual patterns of confidence and temptation creating a particular combination for that individual result in weight loss. The finding that for the women who lost most weight both temptation and confidence were high, for that person is both cognitively and behaviourally consistent. In terms of Bandura's theory a high score or increased expectations should result in greater weight loss. In behavioural terms, if weight loss tends to occur when both temptation and confidence are high then these conditions become most reinforcing and they are the ones that will allow the person to continue to lose weight. In agreement with Bandura, performance accomplishments are the greatest source of both judging and enhancing personal expectations of efficacy.

SUMMARY AND CONCLUSIONS

The major findings of the study are firstly, that self-efficacy scores can distinguish a variety of populations. Secondly, locus of control and self-efficacy appear to be distinct in what they measure. Thirdly, it would appear that self-efficacy and weight loss are related in such a way that increases in self-efficacy are associated with weight loss. Fourthly, although self-efficacy scores did not predict response to treatment, sample size was a methodological difficulty. Lastly, a trend is suggested whereby temptation and confidence are separate but not independent components of self-efficacy that create an individual weight loss balance for each subject. At present in terms of weight loss these results are only suggestive. Trends do suggest interesting ideas for further research, clarifying a number of issues.

It is important to test the questionnaire with more populations to further test the validity and reliability of the questionnaire. In the present study specific groups of people were tested and the extent to which distinctions can be made with a random population sample or with other specific populations has yet to be tested.

An interesting issue to look at concerns the relationship between self-efficacy and weight loss. It is not clear whether self-efficacy improves through treatment or through weight loss. A treatment that aims to increase self-efficacy may be useful to address this question. In addition, future studies should include control groups to asses whether these are self-efficacy fluctuations amongst people not in treatment. The performance success of losing weight, in terms of Bandura's theory, should have the greatest impact on self-efficacy. However, it seems reasonable that cognitive methods used during treatment may further increase the effect, although this remains to be tested.

Numerous studies involving self-efficacy have attested to the predictive

value of the concept. Larger samples would be necessary to assess the predictive value of self-efficacy in weight loss. In additional longitudinal data may enable identification of whether self-efficacy on weight is primary in accounting for the variance. It is possible that a series of complex, reversing lag relationships may describe the process with self-efficacy affecting weight for a time and weight influencing self-efficacy for a time. However, it would appear that this reciprocal determination is a difficult concept to test with present methodology which attempts to identify causal links.

Maintenance of self-efficacy and how weight loss is influenced by self-efficacy long-term is an important issue to address. Longitudinal data is necessary to establish maintenance effects.

Another line of research suggested by the present results concerns the temptation and confidence components of self-efficacy. Larger samples involving detailed long-term analysis would be needed to assess this apparently individual response during weight loss.

The findings here lend support to Bandura's (1977) theory and to subsequent research done on the concept of self-efficacy. In terms of understanding weight loss by use of the concept of self-efficacy, an understanding and knowledge of individual physiological differences that occur between people is important.

Studies linking self-efficacy and weight loss have only begun, and although appear promising, much research is needed to identify the usefulness of the concept of self-efficacy in predicting weight loss, in describing the process of weight loss and in the maintenance of that loss.

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Appendix 1 Pilot Questionnaire

SITUATION:

		1. Extremely Important	2. Very Important	3. Moderately Important	4. Not very Important	5. Not important at all
1.	When alone and feeling depressed					
2.	When I am nervous					
3.	While talking and relaxing					
4.	With my spouse or a close friend who is eating					
5.	When under pressure in my job					
6.	When I wake up in the morning and face a tough day.					
7.	When happy and celebrating					
8.	When I am bored and having nothing to do					
9.	When I experience an emotional crisis such as an accident or death in the family					
10.	When I see that I am gaining weight					
11.	When I am extremely anxious and stressed					
12.	When I am frustrated about events in my life					
13.	When I am very angry about something or someone					
14.	When there are arguments and conflicts in my office or family					
15.	When I see I am losing weight					
16.	When I am feeling warm and affectionate with my mate					
17.	When I see someone eating and enjoying it					
18.	When I really miss eating and am feeling hungry					
19.	When things are just not going the way I want and I am frustrated					
20.	When others around me are eating					
21.	When I feel excited					

SITUATION:	1. Extremely Important	2. Very Important	3. Moderately Important	4. Not very Important	5. Not important at all
22. When I realise that dieting is an extremely difficult task for me.					
23. When I am extremely depressed					
24. When I just don't give a damn about anything					
25. When I begin to let down on my concern about my health and less physical activity					
26. When I want to test my control over food and just eat one thing					
27. When I feel impatient					
28. When I just want to take a break from work or some other activity.					
29. When I am worried or feel upset					
30. When I want something in my mouth					
31. When I want to concentrate					
32. When I want to cheer up					
33. When I feel tense or nervous					
34. When I want something to do with my hands					
35. When I feel I need more energy					
36. When I am waiting for someone or something					
37. When I want to reward myself for something I've done or tell myself that I can have a snack if I complete a task					
38. When I feel tired					
39. When I feel restless and don't know what to do with myself					
40. When I am doing something else (e.g. watching TV, reading a book or magazine)					
41. When I feel annoyed					
42. When someone offers me food					
43. When I am feeling uncomfortable					

SITUATION:

		1. Extremely Important	2. Very Important	3. Moderately Important	4. Not very Important	5. Not important at all
44.	When I am clearing away leftovers after a meal					
45.	When I am drinking					
46.	When I feel embarrassed					
47.	When I am eating out at a friend's place or a restaurant					
48.	When I am preparing food					
49.	When I want to keep myself busy					
50.	When I am trying to pass time					
51.	When I am on holiday					
52.	When I am feeding the family					
53.	When I see an advertisement about food					
54.	When the children are home					
55.	When I get up in the middle of the night					
56.	When I am out for a drive in the car					
57.	On arriving home					
58.	When people are talking about food					
59.	When people come to visit me					

Please list below any situation not listed above that is important to you while dieting;

SELF-EFFICACY AND WEIGHT LOSS - GENERAL INTERVIEW QUESTIONNAIRE

SUMMARY SHEET

Date _____

Name _____

Address _____ Telephone No. _____

Demographic Data

Sex _____ Age _____

Education _____

Occupation _____ Marital Status _____ Nationality _____

Weight Control History

Actual Weight _____ Goal Weight _____

When did you become overweight _____

How long have you been trying to diet _____

What types of things did you try and when _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

How much overweight _____

Has the person ever lost a lot of weight before _____

How long have they been at the clinic _____

2.

General Health

Any medication/pills _____

_____

Levels of Stress

Recent changes in :

1. Residence _____
2. Occupation _____
3. People lived with _____
4. Close friends _____
5. Responsibilities _____
6. Financial situation _____

Stress level : Mild Moderate Severe

Appendix 3 Self-Efficacy Questionnaire

EATING SITUATIONS

Listed below are situations that lead some people to eat. We would like to know:

(a) How tempted you may be to eat in each situation, AND

(b) How confident you would be that you would not eat.

Please check the boxes that best describe your feelings in each situation.

A: How tempted would you be to eat in this situation? 1	2	3	4	5		B: How confident are you that you would not eat in this situation? 1	2	3	4	5
					1. When alone and feeling depressed					
					2. When I am nervous					
					3. With my spouse or a close friend who is eating					
					4. When under pressure in my job					
					5. When happy and celebrating					
					6. When I am bored & have nothing to do					
					7. When I experience an emotional crisis such as an accident or death in the family					
					8. When I see that I am gaining weight					
					9. When I am extremely anxious and depressed					
					10. When I am frustrated about events in my life					
					11. When I am very angry about something or someone					
					12. When there are arguments or conflicts in my family					
					13. When I see someone eating and enjoying it					
					14. When I really miss eating and am feeling hungry					
					15. When things are just not going the way I want and I am frustrated					
					16. When others around me are eating					

2.

How tempted would you be to eat in this situation?						How confident are you that you would not eat in this situation?				
1	2	3	4	5		1	2	3	4	5
					17. When I realise that dieting is an extremely difficult task for me					
					18. When I am extremely depressed					
					19. When I just don't give a damn about anything					
					20. When I begin to let down on my concern about my health and am less physically active					
					21. When I want to test my control over food and just eat one thing					
					22. When I feel impatient					
					23. When I want to take a break from work or some other activity					
					24. When I am worried or feel upset					
					25. When I want something in my mouth					
					26. When I want to cheer up					
					27. When I feel tense or nervous					
					28. When I feel I need more energy					
					29. When I am waiting for someone or something					
					30. When I feel tired					
					31. When I feel restless and don't know what to do with myself					
					32. When someone offers me food					
					33. When I am cleaning up leftovers after a meal					
					34. While I am drinking					
					35. When I am eating out at a friend's place or restaurant					
					36. When I am preparing food					
					37. When I am trying to pass time					
					38. When I am on holiday					
					39. When I am feeding the family					
					40. On arriving home					

3.

Please list below any situation not listed above that is important to you while dieting:

Appendix 4

ROTTER SCALE

For each pair of statements below please circle a or b, depending on which best describes the way you feel.

1. a. Children get into trouble because their parents punish them too much.

   b. The trouble with most children nowadays is that their parents are too easy with them.

2. a. Many of the unhappy things in people's lives are partly due to bad luck.

   b. People's misfortunes result from the mistakes they make.

3. a. One of the major reasons why we have wars is because people don't take enough interest in politics.

   b. There will always be wars, no matter how hard people try to prevent them.

4. a. In the long run people get the respect they deserve in this world.

   b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5. a. The ideas that teachers are unfair to students is nonsense.

   b. Most students don't realise the extent to which their grades are influenced by accidental happenings.

6. a. Without the right breaks one cannot be an effective leader.

   b. Capable people who fail to become leaders have not taken advantage of their opportunities.

7. a. No matter how hard you try some people just don't like you.

   b. People who can't get others to like them don't understand how to get along with others.

8. a. Heredit ery plays the major role in determining one's personality.

   b. It is one's experiences in life which determine what they are like.

9. a. I have often found that what is going to happen will happen.

   b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10. a. In the case of the well prepared student there is rarely if ever such a thing as an unfair test.

    b. Many times exam questions tend to be so unrelated to course work that studying is really useless.

11. a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.

    b. Getting a job depends mainly on being in the right place at the right time.

12. a. The average citizen can have an influence in government decisions.

    b. This world is run by the few people in power, and there is not much the little guy can do about it.

13. a. When I make plans, I am almost certain I can make them work.

    b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

14. a. There are certain people who are just no good.

    b. There is some good in everybody.

15. a. In my case getting what I want has little or nothing to do with luck.

    b. Many times we might just as well decide what to do by flipping a coin.

16. a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.

    b. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.

17. a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.

    b. By taking an active part in political and social affairs the people can control world events.

18. a. Most people don't realise the extent to which their lives are controlled by accidental happenings.

    b. There is really no such thing as 'luck'.

19. a. One should always be willing to admit mistakes.

    b. It is usually best to cover up one's mistakes.

20. a. It is hard to know whether or not a person really likes you.

    b. How many friends you have depends upon how nice a person you are.

21. a. In the long run the bad things that happen to us are balanced by the good ones.

    b. Most misfortunes are the result of lack of ability, ignorance, laziness or all three.

22. a. With enough effort we can wipe out political corruption.

    b. It is difficult for people to have much control over the things politicians do in office.

23. a. Sometimes I can't understand how teachers arrive at the grades they give.

    b. There is a direct connection between how hard I study and the grades I get.

24. a. A good leader expects people to decide for themselves what they should do.

    b. A good leader makes it clear to everybody what their jobs are.

25. a. Many times I feel that I have little influence over the things that happen to me.

    b. It is impossible for me to believe that chance or luck plays an important role in my life.

26. a. People are lonely because they don't try to be friendly.

    b. There's not much use in trying too hard to please people, if they like you, they like you.

27. a. There is too much emphasis on athletics in high school.

    b. Team sports are an excellent way to build character.

28. a. What happens to me is my own doing.

    b. Sometimes I feel that I don't have enough control over the direction my life is taking.

29. a. Most of the time I can't understand why politicians behave the way they do.

    b. In the long run the people are responsible for bad government on a national as well as on a local level.

Source: Rotter, J. Generalised Expectancies for Internal versus External Control of Reinforcement. Psychological Monographs, 1966, Vol. 80, No. 1 P.1-

WOMEN — PERCENT OVER OR UNDER IDEAL WEIGHT

(In ordinary light clothing, & heights in shoes)

WEIGHT		HEIGHT	cms	147	150	152	155	158	160	163	165	168	170	173	175	178	180	183
Pounds	Kilograms		ins	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
80-84	36.0-38.0			-19	-21	-23	-25	-27	-29	-31	-33	-36	-38	-39	-41	-43	-44	-46
85-89	38.5-40.0			-14	-16	-19	-21	-23	-25	-27	-29	-32	-34	-36	-38	-39	-41	-43
90-94	40.5-42.5			- 9	-12	-14	-16	-19	-21	-23	-25	-28	-30	-32	-34	-36	-38	-39
95-99	43.0-45.0			- 4	- 7	- 9	-12	-14	-16	-19	-21	-24	-26	-28	-30	-32	-34	-36
100-104	45.5-47.0			0	0	- 5	- 7	-10	-12	-15	-17	-20	-22	-25	-27	-29	-31	-33
105-109	47.5-49.5			5	3	0	- 3	- 5	- 8	-10	-13	-16	-19	-21	-23	-25	-27	-29
110-114	50.0-52.0			10	8	5	0	0	- 3	- 6	- 9	-12	-15	-17	-20	-22	-24	-26
115-119	52.5-54.0			15	12	9	6	4	0	- 2	- 5	- 8	-11	-14	-16	-18	-21	-23
120-124	54.5-56.0			20	17	14	11	8	5	2	0	- 4	- 7	-10	-13	-15	-17	-19
125-129	56.5-58.5			25	22	19	15	12	9	6	3	0	- 3	- 6	- 9	-11	-14	-16
130-134	59.0-60.5			30	27	23	20	17	14	10	7	4	0	- 3	- 5	- 8	-11	-13
135-139	61.0-63.0			35	32	28	25	21	18	15	11	7	4	0	- 2	- 5	- 7	-10
140-144	63.5-65.0			40	37	33	29	26	22	19	15	11	8	5	2	0	- 4	- 6
145-149	65.5-67.5			45	41	37	34	30	27	23	20	15	12	8	5	2	0	- 3
150-154	68.0-70.0			50	46	42	38	35	31	27	24	19	16	12	9	6	3	0
155-159	70.5-72.0			55	51	47	43	39	35	31	28	23	19	16	13	9	6	4
160-164	72.5-74.5			60	56	51	47	43	40	36	32	27	23	20	16	13	10	7
165-169	75.0-76.5			65	61	56	52	48	44	40	36	31	27	23	20	16	13	10
170-174	77.0-79.0			69	65	61	56	52	48	44	40	35	31	27	23	20	17	14
175-179	79.5-81.0			74	70	65	61	57	53	48	44	39	35	31	27	23	20	17
180-184	81.5-83.5			79	75	70	65	61	57	52	48	43	38	34	30	27	23	20
185-189	84.0-85.5			84	80	75	70	65	61	56	52	47	42	38	34	30	27	23
190-194	86.0-88.0			89	85	79	75	70	66	61	56	51	46	42	38	34	30	27
195-199	88.5-90.0			94	89	84	79	74	70	65	60	55	50	45	41	37	34	30
200-204	90.5-92.5			100	94	89	84	79	74	69	64	58	54	49	45	41	37	33
205-209	93.0-95.0			-	100	93	88	83	78	73	68	62	57	53	48	44	40	37
210-214	95.5-97.0			-	-	98	93	88	83	77	72	66	61	56	52	48	44	40
215-219	97.5-99.0			-	-	100	97	92	87	82	76	70	65	60	56	51	47	43
220-224	99.5-101.5			-	-	-	100	96	91	86	80	74	69	64	59	55	51	47
225-229	102.0-103.5			Blanks signify			-	100	96	90	85	78	73	68	63	58	54	50
230-234	104.0-106.0			more than 100%			-	-	100	94	89	82	76	71	66	62	57	53
235-239	106.5-108.5			overweight			-	-	-	98	93	86	80	75	70	65	61	56
240-244	109.0-110.5			-	-	-	-	-	-	-	100	97	90	84	79	73	69	64	60
245-249	111.0-113.0			-	-	-	-	-	-	-	-	100	94	88	82	77	72	67	63

SOURCE: Based on desirable weights (in ordinary clothing) for men and women of medium frame, at ages 25 and over, according to height (with shoes). Derived from tables in: New weight standards for men and women. Statistical Bulletin, Metropolitan Life Insurance Company 40: p. 3, November-December, 1959, which were derived primarily from data of the Build and Blood Pressure Study, 1959, Society of Actuaries.

POST-TREATMENT EVALUATION SHEET

Papanui Medical Centre,
Papanui Road,
CHRISTCHURCH

Dear

We are very keen to evaluate our past weight control groups in an effort to judge whether they are worthwhile and how we can improve them. We would be grateful if you would answer the questions below and add any other comments you would like to make.

1. Was the number of sessions too few/ideal/too many

2. Did the group help Yes/No
In what way?

_____

_____

Could you have done it by yourself Yes/No

Did you learn things from the other people in the group Yes/No

3. Did it lead to changes

personally - do you feel more confident Yes/No

energetic Yes/No

assertive Yes/No

in control Yes/No

in life style - in the management of your household Yes/No

buying and preparing different foods Yes/No

in the amount of exercise you do Yes/No

in eating habits - eating slowly Yes/No

sitting down to eat Yes/No

eating only in one place Yes/No

small plate Yes/No

avoiding eating when not hungry Yes/No

avoiding eating when feeling bored,tired, sad, lonely or angry Yes/No

socially - do you go out more Yes/No

do you feel positive about yourself when you go out Yes/No

do you feel pleased with the way you manage your food intake when you are out Yes/No

4. What sort of strategies have you developed as alternatives to eating

_____

_____

_____

2.

Do you react differently to pressures to eat from people who are important in your life. (Parents, husbands, children/friends) Yes/No

In what way _____

_____

_____

5. Did being in the group lead on to involvement in other activities in terms of weight control (e.g. other clubs or groups, exercise programmes)? Please specify.

6. Was this weight control group different from others Yes/No

In what way was this group different for you?

_____

_____

7. Do you think you could have got any of the positive things from anywhere else?

_____

_____

_____

8. How could the group be improved?

_____

_____

_____

9. Did you lose weight? Yes/No

Have you maintained that loss? Yes/No

Any other comments: _____

_____

_____

_____

_____

_____

We appreciate your co-operation and effort.

Appendix 7 Eating Behaviour Questionaire

Circle ONE of the following:-

1. I am within 10% of my ideal body weight and do not try to control or restrict my eating.

2. I am within 10% of my ideal body weight and remain that way by controlling or restricting my food intake.

3. I am not within 10% of my ideal body weight

MODERN FOOD GROUPS FOR GOOD HEALTH

STAPLE FOODS

Include:- Potatoes, rice, spaghetti, bread - white and wholemeal, legumes, muesli, porridge, wholegrain cereals, taro.

For an adequate balance of the nutrients supplied by these foods wholegrain cereals and bread should occupy at least half of the intake of these foods.

A weight loss intake of these foods would include daily:-

3 oz potatoes, taro
OR 1/3 cup cooked legumes, rice, spaghetti
½ cup porridge, cereals
3-4 slices wholemeal or white bread

CENTRE FOODS

Include:- Mutton, beef, lamb, offal meats (remove visible fat)
Poultry - chicken, turkey
Fish - including shellfish (Mussels, paua, oysters)
Eggs
Cheese - cottage cheese, cheddar
Milk - low fat milk for adults - not for babies

A weight loss intake of these foods would include daily:-

2-3 oz meat, poultry or fish. Remember that the flesh of poultry or fish is lower in fat and could be eaten 2-3 times per week.

1 egg or 1 oz cheddar or 2 oz cottage cheese [1 egg (No. 5) equals 1 oz cheese or 1 oz meat].

½ pint milk (either low fat, skim powdered mikl or with top cream poured off).

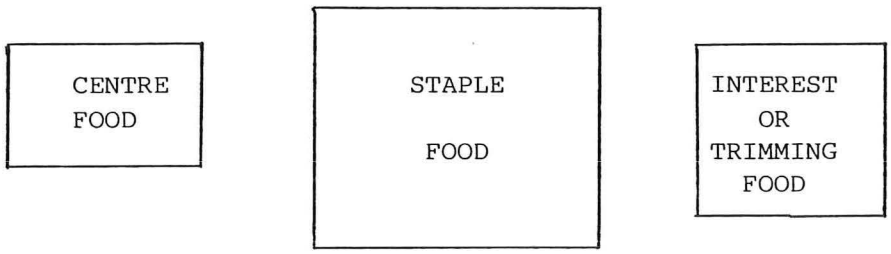
INTEREST OR TRIMMING FOODS

Include:- Vegetables - all kinds
Fruit and fruit juices - all kinds providing that sugar is not added.

A weight loss intake of these foods would include daily:-

2-3 servings of vegetables
2-3 pieces of fruit OR ½ cup fruit juice in exchange for 1 piece of fruit.

Balance of Meals based on Modern Food Groups



Examples of dishes based on this balance:--

Rice risotto
Chicken Chow Mein
Pizza
Hamburgers
Mixed bean salad with tuna
Baked beans with cheese
Baked potatoes with cheese sauce and coleslaw

SPECIAL CONSIDERATIONS FOR THOSE WHO WANT TO CHANGE THEIR EATING HABITS

Fats, Oils, Butter, Margarine:-

Should be limited because of high calorie content -

2-3 teaspoons margarine or butter
OR
2 teaspoons margarine or butter plus 2 teaspoons mayonnaise or salad dressing
OR
2 teaspoons margarine or butter plus 1 teaspoon oil for greasing pan when frying.

REMEMBER:- Cottage cheese or peanut butter or meat or fish spreads can be used as an alternative to butter or margarine, occasionally.

All Bran, San Bran, Bran Flakes:-

Constipation is often a problem for those who alter their eating habits. These products are all valuable to maintain regularity at this time.

These products may be used instead of cereals or in the case of bran flakes, can be added to other cereals, eaten with fruit juice or added to stews or casseroles as thickeners.

Sal
Salt:-

We need to add iodised salt to our food.

However, the natural salt in many foods means that we get much more salt than our needs. Therefore, salt should not be added to food at table. New Zealanders need to reduce salt 50-80%.

Coffee:-

Not more than 3 cups of coffee per day. Drink water for thirst. There is enough caffeine for our body in one cup.

Empty Calorie Foods:

These contain no nourishment apart from energy and should therefore be omitted from the diet of those trying to reduce their energy intake:-

Cakes, biscuits, sweets
Alcohol, cordials, fizzy drinks
Sugar containing foods - honey, jam, glucose
Chocolate
Fried or fatty foods

Water:

At least 4-5 glasses of water should be drunk daily, especially if weight loss is occurring or if thirst is a problem.

Artificial Sweeteners

If a high sugar intake has occurred previously, artificial sweeteners may make life easier when giving up sugar.

In general it is better to rely on raw fruit, lightly sweetened fruit and a greatly reduced intake of highly refined, empty calorie food.

Small regular meals:-

5-6 small meals, or three larger means using the amounts of food suggested are better than 1 large meal followed by uncontrolled "reward" eating.

DAILY FOOD INTAKE

Food Group	Good Sources of These Nutrients	One Serving Equals	Recommended Servings			
			Child (1-10 yrs)	Teen (11-18 Yrs)	Adult (19 + yrs)	Pregnant/ Breast-feeding
LEAFY GREEN VEGETABLES Romaine, red leaf lettuce; spinach and other greens; broccoli, brussel sprouts, cabbage; asparagus; parsley, watercress, scallions, mint.	Excellent sources of folic acid, vitamin A and B_6, riboflavin, and magnesium. Also supply good amounts of iron, potassium and fiber.	1 cup raw; ¾ cup cooked.	1	1	2	2
C-RICH FRUITS & VEGETABLES Citrus; tomatoes; berries; melons (papaya, mango, cantaloupe); peppers; cabbage, cauliflower, broccoli.	Excellent sources of vitamin C and potassium. Also supply folic acid, vitamin A and fiber.	1 orange; ½ grapefruit or cantaloupe; 2 lemons; 2 tomatoes; ½ cup of sliced fruit or vegetable; ½ cup of orange/grapefruit juice; 1½ cups tomato juice.	1	2	2	2
OTHER FRUITS & VEGETABLES Green beans; peas; corn; potatoes; and all other fruits and vegetables not on the preceding two lists.	Provide carbohydrates, fiber and potassium, as well as smaller amounts of other essential vitamins and minerals. If deep orange and/or yellow, also excellent sources of vitamin A.	1 medium piece of fruit or vegetable; ½ cup of sliced raw or cooked fruit or vegetable.	2	3	3	3
PROTEN-RICH FOODS Animal: meat, poultry, seafood, eggs. Vegetable: dried beans, lentils, split peas, peanuts, nuts, tofu.	All are excellent sources of protein, iron, vitamin B_6, zinc. All animal protein supplies vitamin B_{12}. Seafood supplies iodine and selenium. Vegetable protein supplies folic acid, vitamin E and magnesium.	2 oz cooked lean meat, poultry, seafood; 2 eggs; 1 cup of cooked beans; ½ cup of nuts, 4 tbs. of peanut butter; ½ cup of tofu.	1½	3-4	2	4
			Try to have 1-2 servings from vegetable protein.			
BREADS AND CEREALS Whole-grain and enriched breads, rolls, tortillas; noodles; oatmeal; rice, barley.	All provide carbohydrates and some protein. (Protein quality improved when eaten together with protein foods listed above or milk products). Also provide thiamin, niacin, riboflavin and iron, if enriched. Whole grains provide additional vitamin B_6, folic acid, vitamin E, magnesium, zinc and fiber.	1 slice bread, 1 tortilla; ½ bun or English muffin; 1 dinner roll; ¾ cup of dry cereal; ½ cup of cooked cereal, rice, or noodles; 1 tbs. of wheat germ.	4	5	4	5
			Try to have 2-3 servings from whole grain products.			
MILK PRODUCTS Milk, yogurt, kefir, cheese.	All are excellent sources of protein and calcium, in addition to vitamin A, B_{12} and riboflavin. Fortified fluid milk also contains 100 IU of vitamin D per cup. Cheese is a good source of zinc.	1 cup of milk, yogurt, or kefir; 1½ slices, 1½ ounces or ⅓ cup of grated brick-type cheese; 5 tbs. of Parmesan; or 1¼ cups of cottage cheese; 1 cup of tofu (contains no vitamin B_{12} or D).	2	3	2	4
FATS AND OILS Butter, margarine, vegetable oils, seeds, avocadoes, olives.	Provide energy because of the fat they contain. The polyunsaturated vegetable oils and seeds are good sources of the essential fatty acids and moderate to good sources of vitamin E.	1 tsp. of butter, oil, margarine, or mayonnaise; ⅛ avocado; 5 small olives; 2 tsp. of sesame or sunflower seeds; 5-7 nuts; 2 tbs. of sour cream, 2 tbs. of coffee cream; ½ tbs. of salad dressing.	3	4	4	5

HOW MUCH DO YOU WANT TO LOSE WEIGHT

	I strongly disagree	I disagree	I'm not sure	I agree	I strongly agree
1. Most of my friends eat more than me, so why should I deny myself?					
2. I have already cut down on my food and still my weight goes up!					
3. It is alright to eat now, I can always diet some time in the future!					
4. It is alright to be over-weight now as my health is not affected!					
5. I don't have enough will-power to keep to a diet!					
6. Eating is sociable and helps me to get on with people!					
7. I get so irritable and bad tempered when dieting it is not fair to those around me!					
8. I can spend as much money as I like on food, but not on my special needs!					
9. Being overweight does not affect my life!					
10. Being overweight does not affect how people treat me.					

Appendix 12

FOOD HANDLING BEHAVIOUR CHANGE

1. Supermarket behaviour:-

   a) Never go to the supermarket feeling hungry.

   b) Avoid buying convenience type snacks.

   c) Make a shopping list and avoid impulse buying

   d) Avoid buying highly sweetened or fat containing foods such as chips, cakes, biscuits, cordials, sweets or chocolate.

   If your family want these things let them go and buy them for themselves.

2. Kitchen behaviour:-

   a) Put food in opaque containers. Out of sight is out of mind.

   b) Avoid bulk buying of tempting food. Put money saved towards a reward for you.

   c) Plan meals ahead. This allows you to buy wisely, prepare food economically and make decisions about food choices when you are relaxed and not hungry.

   d) To control 'nibbling' when preparing meals, tape a paper bag to the work bench and put an equal amount of each 'nibble' in the bag. Each ounce = 100 calories!

3. Social Behaviour:-

   a) If you are not hungry - don't eat.

   b) If you are pressed to eat and you don't want to, it is your right to say NO and to have your choice respected.

   c) State your decision about food choices positively. "I prefer salad because I enjoy it, it gives me chewing satisfaction etc." NOT "I can't have it - I am on a diet".

Eating Environment:

Look round your home, your work place, and remove all the food to just one place.

You may find that you have little stores of food in all sorts of places.

MANAGEMENT OF HUNGER

1. Eat Slowly: - Your brain needs 20 minutes to know that your stomach is filling.

   a. Put your knife and fork down on the plate between mouthfuls of food.

   b. Sip a glass of iced water (or occasionally wine or gin and diabetic lemonade, etc) during the meal.

   c. Chew food well. Enjoy each mouthful.

2. Eat in the same place: - Food that is eaten "on the wing" is forgotten food. Be honest about the food you are eating.

   a. Preferably eat somewhere away from the kitchen.

   b. Always set a place mat, plate, etc., for anything you eat whether a meal, a snack, or a "cheat".

   c. Place all the food for your meal, snack or cheat on the table before you sit down. Do not go back for "seconds" or something you have forgotten.

3. Eat with enjoyment: - Eating is a "good" activity. Food is good. The "bad" things are the feelings that cause you to over-eat, or to eat without thought or to eat with guilt.

   a. When you eat, think of the good things about your meal. The appearance, taste, smell and texture of the food.

   b. A small well-filled plate looks more interesting than a big empty one.

   c. Concentrate on the meal, do not sew, knit, read, or watch television when eating, as this prevents you from thinking about the food and enjoying it properly.

ARE YOU REALLY HUNGRY

True hunger is felt only when three or four hours has passed since you last ate or drank.

Life has taught us that "bad" feelings such as sadness, anger, boredom, and loneliness can be covered by food. So that instead of being honest about these feelings we pretend that we feel hungry because it is more comfortable to say "I feel hungry", rather than "I feel angry" (or sad, or lonely, etc).

PERSONAL TECHNIQUES

The following is the sample list of changes that worked for many of our clients.

1. Keeping food records.
2. Only eating when truly hungry.
3. Going to restaurants for my favourite, favourite foods instead of keeping them in the house where they are too tempting.
4. "Banking" calories in advance to allow for extra calories for special occasions.
5. Treating myself at least once a week to a favourite food.
6. Having regularly scheduled weigh-ins at home.
7. Using stairs instead of elevators.
8. Making meals "events" when possible; i.e., candlelight, cloth napkins.
9. Not depriving myself of "junk" food.
10. Eating real foods, not diet stuff.
11. Scheduling snacks to be available when hunger comes.
12. Planning interesting activities to be used at periods of hunger.
13. Have several backup plans prepared ahead of time.
14. Recognizing the situations that cause me to eat.
15. Allowing myself some old habits that weren't so bad after all.
16. Going to the grocery store every few days instead of every few weeks.
17. Always grocery shopping from lists and not choosing things impulsively.
18. Avoiding grocery aisles that stock food not on my list.
19. Eating on a relatively regular time schedule.
20. Sleeping on a relatively regular time schedule.
21. Rewarding myself with new clothes instead of food on events such as birthdays, anniversaries, etc.
22. Carry a calorie book.
23. Walking to work.
24. Adding variety on a regular basis.
25. Preplanning - creating combination meals and snacks that contain approximately the right amount of calories.

STIMULUS CONTROL CHECKSLIST

Many foods and situations seem to cue eating almost automatically. In order to control these stimuli or cues which make us eat, we have presented suggestions for changing some of your behaviour.

(Check Behaviour to Work On)

Buying Food

_____ Eat just before shopping

_____ Shop from a list.

_____ Do not buy foods not on your programme which will be tempting to you

_____ Buy enough to prepare for legal snacks/desserts.

Preparation, Storage, and Serving of Food

_____ Prepare exact proportions - not more

_____ Serve your exact portion before coming to the table

_____ Use smaller dishes to maximize the appearance of the size of your portion

_____ Avoid bringing bowls/platters of food to the table

_____ Store limited foods in opaque containers in the back of the refrigerator

_____ Keep unlimited foods in clear containers in front of the refrigerator

_____ Keep "family-only" foods stored in back of shelves away from your view

Eating Food

_____ Always sit down before eating, no matter how small the amount of food to be consumed

_____ Eat slowly, putting fork down, taking pauses in meal

_____ Take smaller bites

_____ Separate eating from other activities

_____ Eat only if you are hungry (discriminate hunger vs. desire)

_____ Don't eat to avoid waste

Cleaning Up Food

_____ Before you sit down to eat, put away food on the counter

_____ Clear away leftovers directly into garbage

Snacking

_____ Examine habit record or food diary to analyze snacking patterns

GENERAL TECHNIQUES

- Each day keep records of all food eaten.
- At home, limit all food intake to one specific place.
- Rearrange food supplies - adjust packaging and storage habits.
- Preplan food intake for each day.
- Write down in advance, food you plan to eat.
- Set up a time schedule each day for meals and snacks.
- Make a deliberate decision to eat, don't eat absentmindedly.
- Keep weekly graphs of weight changes and behaviour changes.
- Regard behaviour changes as more important in the long run than immediate weight changes.
- Avoid distracting activities while eating.
- Be seated while eating.
- Do not drop to zero your frequency of eating preferred foods.
- Make sure higher caloric foods are not readily available, but require some preparation.
- Prepare or take snacks to the table in small quantities.
- Have children and spouse prepare their own snacks.
- Keep lower caloric foods more available and more visible than higher caloric foods.
- Develop a tolerance for hunger by thinking of it more as a positive feeling.
- Ask family and friends not to use food for gifts or rewards.
- Change your route if a particular store or vending machine you regularly pass presents a problem.

For Meals and Snacks

- Plan a short delay before starting to eat.
- Swallow food before adding more to utensils.
- Plan a series of brief delays during meals and snacks by:
    - putting down utensils.
    - sipping a beverage.
- Keep extra food away from the table, keep platters in the kitchen.
- When food platters are on the table, move them away from you.
- Use measuring spoons and cups to serve.
- Eat preferred food first.
- Always leave at least a small amount of food on your plate.
- Clear the table immediately after each course; if this is not possible, remove your own plate.
- Cover your plate with your napkin as a signal the meal has ended.
- Have someone else remove, store, or throw away leftovers if these are a problem.

Techniques Useful at Parties and at Restaurants

- Look over the entire array of food before beginning to eat at a buffet.
- Sit at a distance from your favourite snack foods.
- Inquire of the host or hostess what will be served.
- If you are the host of hostess, give away left over party food.
- Avoid a long period of deprivation prior to a party or eating at a restaurant.
- Make special requests for combinations and deletions.

Techniques to be Used Between Ingestions

- Have a list of activities you can substitute for eating at times when you are hungry but have not predetermined that you can eat.
- Decrease frequency of food shopping.
- Prepare a complete shopping list.
- Shop when not hungry.
- Reduce your purchases of problem foods.
- Throw out or give away clothes as they become too large.
- Arrange home activities so that your eating place is entered infrequently.

Physical Activity

- Park your car father away from your destination point.
- Use a distant, rather than a near, telephone or bathroom at home.
- Use the stairs when possible.

Miscellaneous

- Change self-instruction. For example, "I don't have to eat this now; if I'm hungry later, I can have something to eat."
- Be selective and picky about what is eaten.
- Learn to appreciate the sensory aspects of food.
- Learn to refuse food effectively and gracefully when pressured.
- Set realistic goals for vacations and special occasions.
- Reevaluate your priorities.
- Reevaluate your life-style.

NEED TO EAT

	Doesn't Apply	No	Some	Medium	Strong	Very Strong
1. While watching television.						
2. While having a cup of tea or coffee.						
3. While having an alcoholic drink.						
4. As a reward for finishing something.						
5. When I am worried						
6. When I am working at a sit down job.						
7. When I am up late at night.						
8. When I feel lonely.						
9. Whem I am bored and have nothing special to do.						
10. When somebody offers me food.						
11. Whem I feel angry.						
12. When I feel tired.						
13. When I am with others who are eating.						
14. When I need to relax.						
15. When I am talking with friends.						

SCORES FOR SUBJECTS IN EACH OF THE GROUPS

Group 1

Subject	Month	Temptation Score		Confidence Score		SE Score		Weight (kg)		Locus of Control	
1	1 (P/T)	135	H	100	H	235	L	68.5		12	E
	2 (T)	145	H	88	L	233	L	67.0	L		
	3 (T)	133	H	107	H	240	L	65.0	L		
	4 (F/U)	123	H	113	H	236	L	64.5	L		
	5 (F/U)	123	H	125	H	248	H				
	6 (F/U)	125	H	123	H	248	H	62.5	L		
2	1 (P/T)	113	H	117	H	230	L	82.0		13	E
	2 (T)	99	L	149	H	248	H	80.5	L		
	3 (T)	102	H	139	H	241	H	81.5	G		
	4 (F/U)	99	L	150	H	249	H				
	5 (F/U)	98	L	144	H	242	H				
	6 (F/U)	104	H	140	H	244	H	82.5	G		
3	1 (P/T)	125	H	105	H	230	L	74.5		17	E
	2 (T)	116	H	129	H	245	H	73.0	L		
	3 (T)	109	H	128	H	237	L	73.0	M		
	4 (F/U)	95	L	146	H	241	H				
	5 (F/U)										
	6 (F/U)	99	L	142	H	241	H	74.0	G		
4	1 (P/T)	139	H	98	L	237	L	86.0		7	I
	2 (T)	137	H	100	H	237	L	86.5	G		
	3 (T)	123	H	105	H	228	L	84.0	L		
	4 (F/U)	139	H	106	H	245	H				
	5 (F/U)	144	H	99	L	243	H				
	6 (F/U)	150	H	84	L	234	L	82.5	L		
5	1 (P/T)	105	H	100	H	205	L	74.5		9	I
	2 (T)	92	L	76	L	168	L	73.0	L		
	3 (T)	73	L	56	L	129	L	73.5	G		
	4 (F/U)	82	L	115	H	197	L	67.2	L		
	5 (F/U)	82	L	119	H	201	L				
	6 (F/U)	103	H	120	H	223	L	63.6	L		
6	1 (P/T)	154	H	78	L	232	L	63.0		12	E
	2 (T)	149	H	89	L	238	L	61.5	L		
	3 (T)	155	H	84	L	239	L	60.5	L		
	4 (F/U)	151	H	80	L	231	L				
	5 (F/U)	153	H	82	L	235	L				
	6 (F/U)	146	H	85	L	231	L	63.0	G		

Subject	Month	Temptation Score		Confidence Score		SE Score		Weight (kg)		Locus of Control	
7	1 (P/T)	160	H	87	L	247	H	68.0		9	I
	2 (T)	143	H	110	H	253	H	66.0	L		
	3 (T)	149	H	104	H	253	H	67.5	G		
	4 (F/U)	150	H	106	H	256	H	64.0	L		
	5 (F/U)	150	H	102	H	252	H	65.5	G		
	6 (F/U)	150	H	112	H	250	H	65.9	G		
8	1 (P/T)	109	H	132	H	241	H	89.5		7	I
	2 (T)	118	H	120	H	238	L	87.0	L		
	3 (T)	104	H	136	H	240	L	85.0	L		
	4 (F/U)	113	H	128	H	241	H	80.0	L		
	5 (F/U)	109	H	133	H	242	H	79.0	L		
	6 (F/U)	113	H	118	H	231	L	78.0	L		
9	1 (P/T)	122	H	103	H	225	L	71.5		15	E
	2 (T)	138	H	102	H	240	L	69.5	L		
	3 (T)	152	H	88	L	240	L	69.0	L		
	4 (F/U)	131	H	88	L	219	L	71.8	G		
	5 (F/U)	141	H	78	L	219	L	71.8	M		
	6 (F/U)	144	H	84	L	228	L	71.8	M		
10	1 (P/T)	130	H	97	L	227	L	82.0		18	E
	2 (T)	126	H	84	L	210	L	81.5	L		
	3 (T)	118	H	94	L	212	L	82.0	G		
	4 (F/U)							80.9	L		
	5 (F/U)	133	H	105	H	238	L	81.8	G		
	6 (F/U)	131	H	90	L	221	L	80.9	L		
11	1 (P/T)	171	H	88	L	259	H	75.5		16	E
	2 (T)	143	H	103	H	246	H	75.5	M		
	3 (T)	168	H	103	H	271	H	74.0	L		
	4 (F/U)	147	H	111	H	258	H	72.0	L		
	5 (F/U)	148	H	94	L	242	H	73.5	G		
	6 (F/U)	126	H	119	H	245	H	68.2	L		
12	1 (P/T)	89	L	81	L	190	L	110.0		10	I
	2 (T)	107	H	95	L	202	L	111.0	G		
	3 (T)										
	4 (F/U)	114	H	90	L	204	L	111.0	M		
	5 (F/U)										
	6 (F/U)										

Group 2

Subject	SE Score		Locus of Control	
1	241	H	13	E
2	238	L	12	E
3	238	L	5	I
4	253	H	1	I
5	246	H	7	I
6	252	H	7	I
7	247	H	6	I
8	246	H	10	I
9	226	L	6	I
10	228	L	2	I
11	215	L	15	E
12	252	H	6	I
13	237	L	7	I
14	230	L	19	E
15	287	H	8	I
16	251	H	9	I
17	227	L	11	I
18	231	L	11	I

	Subject	SE Score		Locus of Control	
Group 3	1	201	L	12	E
	2	238	L	22	E
	3	229	L	10	I
	4	239	L	6	I
	5	240	L	10	I
	6	235	L	13	E
	7	245	H	7	I
	8	220	L	11	I
	9	236	L	10	I
	10	225	L	9	I
	11	240	L	19	E
	12	240	L	7	I
	13	236	L	15	E
	14	235	L	13	E
	15	229	L	8	I
	16	228	L	20	E
Group 4	1	239	L	7	I
	2	243	H	15	E
	3	220	L	15	E
	4	243	H	10	I
	5	240	L	10	I
	6	205	L	6	I
	7	211	L	13	E
	8	235	L	7	I
	9	241	H	11	I
	10	228	L	18	E
	11	239	L	3	I
Group 5	1	237	L	12	E
	2	239	L	13	E
	3	201	L	14	E
	4	242	H	11	I
	5	242	H	21	E
	6	242	H	0	I
	7	252	H	13	E
	8	212	L	14	E

APPENDIX 18 The relationship between temptation and confidence on an individual level

SUBJECT 1

In looking at the scores over time for subject 1 (refer appendix 17) one can see that for the second data point confidence dropped to its lowest and temptation rose to its highest, however weight was still lost.

See Figure (1)

SUBJECT 2

In looking at the scores over time for subject 2 (refer appendix 17) one can see the three occasions when temptation was low, a weight gain followed. This subject may have overestimated their actual confidence level.

See Figure (2)

FIGURE 1

Temptation, confidence and weight for subject 1

FIGURE 1.

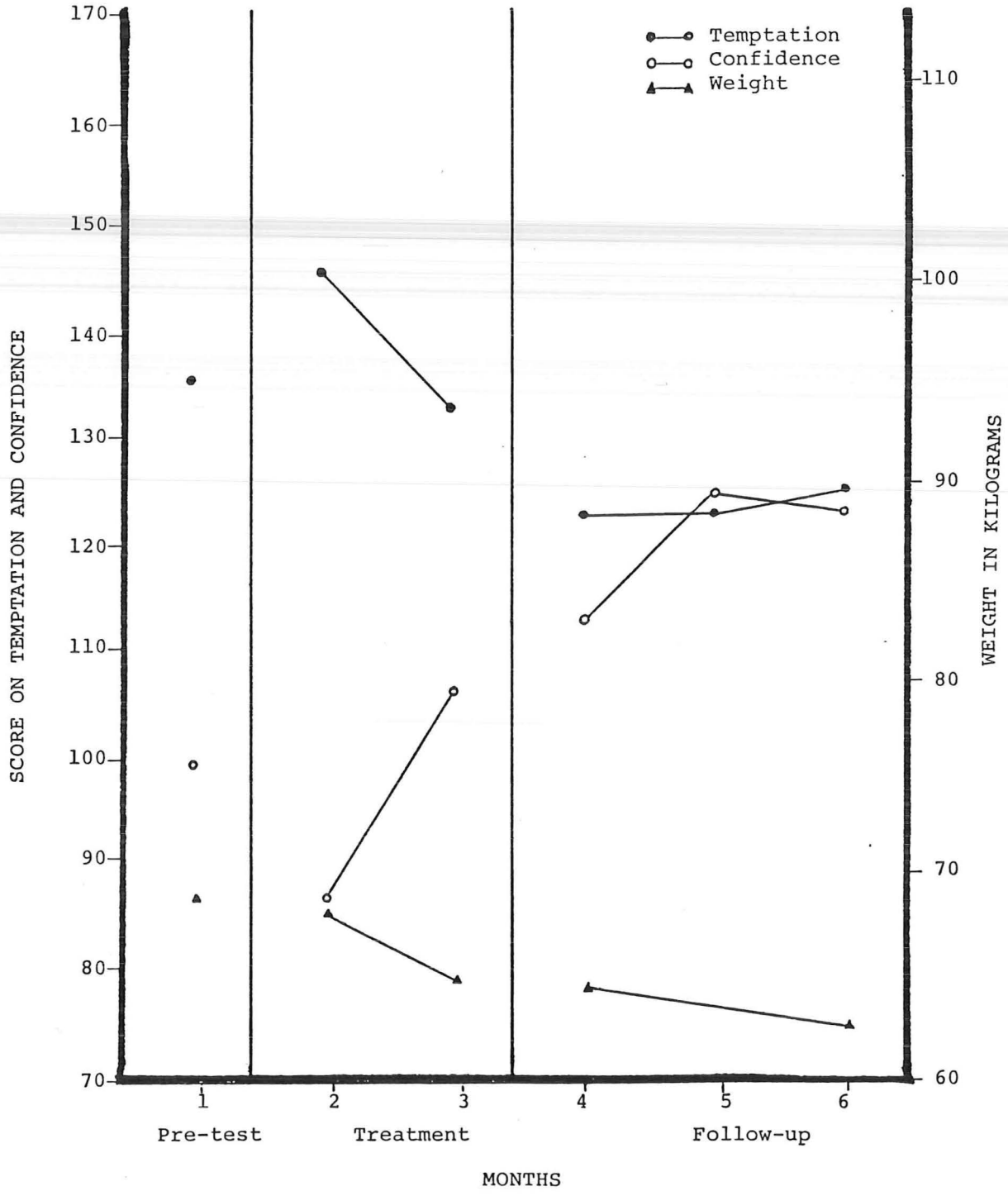
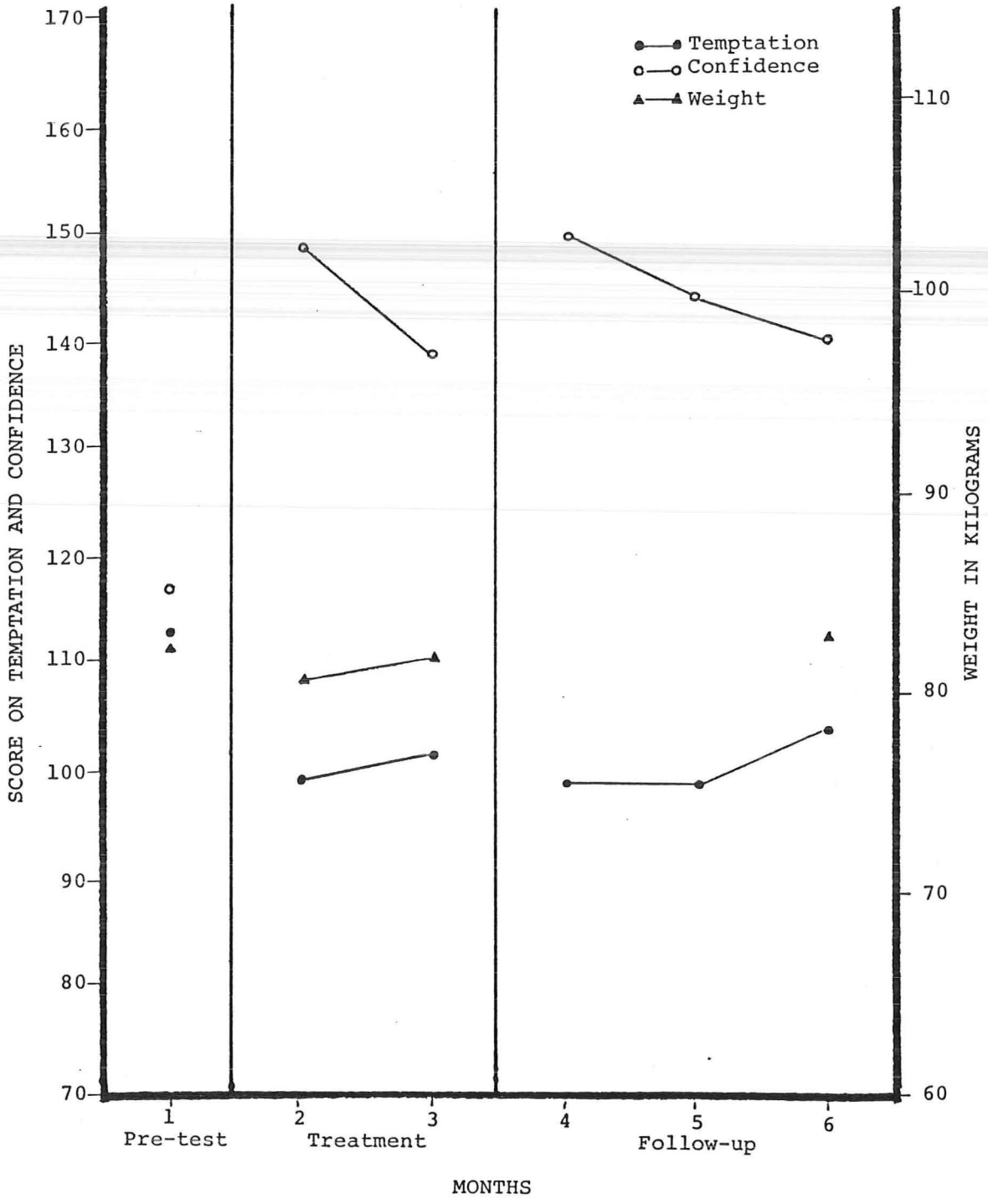

Temptation
Confidence
Weight
SCORE ON TEMPTATION AND CONFIDENCE
WEIGHT IN KILOGRAMS
170
160
150
140
130
120
110
100
90
80
70
110
100
90
80
70
60
1
2
3
4
5
6
Pre-test
Treatment
Follow-up
MONTHS

FIGURE 2

Temptation, confidence and weight for subject 2

FIGURE 2


Temptation
Confidence
Weight
SCORE ON TEMPTATION AND CONFIDENCE
WEIGHT IN KILOGRAMS
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120
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90
80
70
110
100
90
80
70
60
1
Pre-test
2
3
Treatment
4
5
6
Follow-up
MONTHS

SUBJECT 3

In looking at the scores over time for subject 3 (refer appendix 17) one can see that the fourth and sixth data points temptation was low and this was reflected in a weight gain. Confidence remained high and overall at the end of the five months there was still a marginal (.5kg) weight loss.

See figure (3) Dropping temptation levels upset the balance between temptation and confidence needed to lose weight.

SUBJECT 4

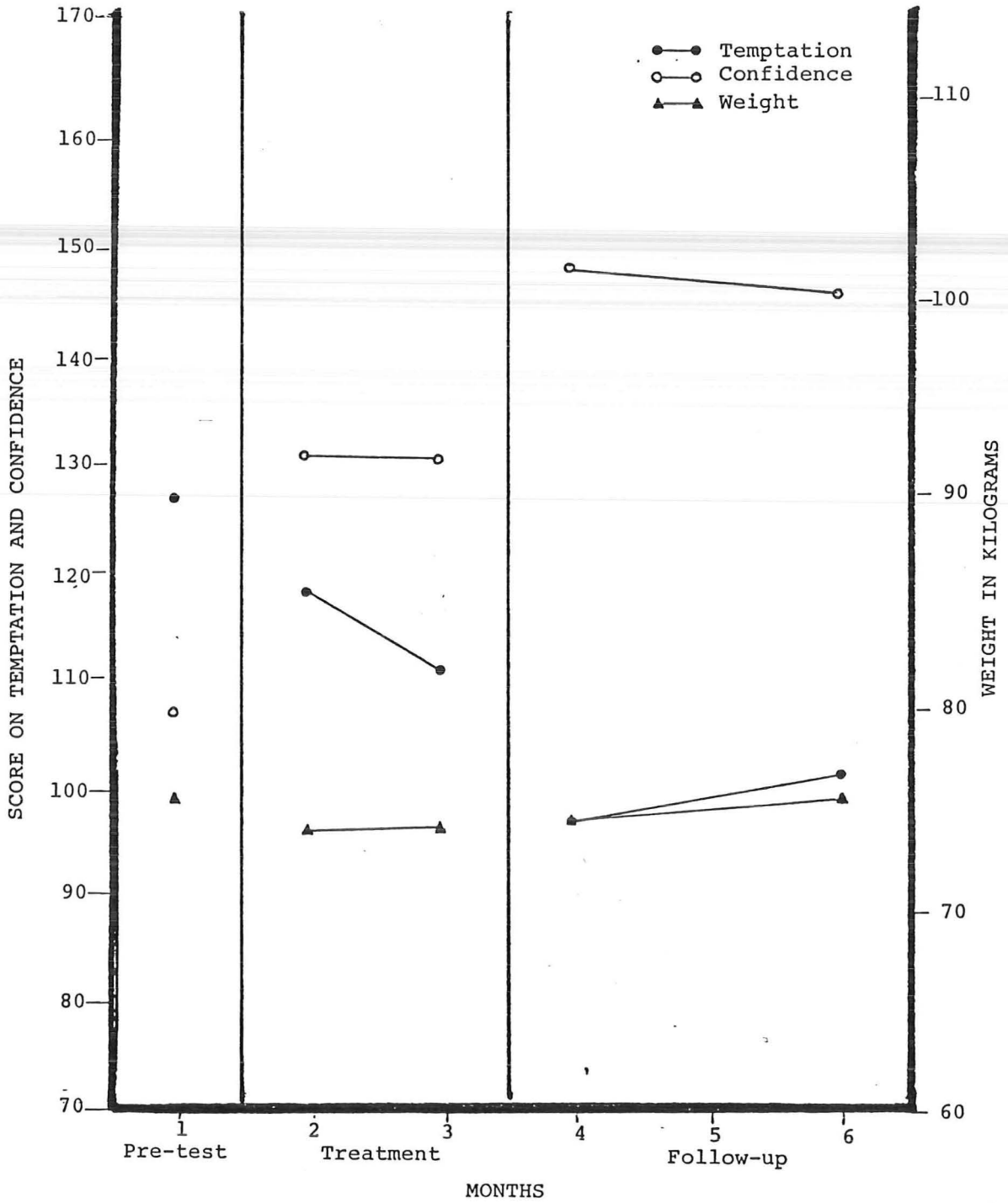
In looking at the scores over time for subject 4 (refer appendix 17) temptation remained high while confidence was mixed. One low confidence was followed by a weight gain, however on the other two occasions weight gain did not follow.

See figure (4)

FIGURE 3

Temptation, confidence and weight for subject 3

FIGURE 3


Temptation
Confidence
Weight
SCORE ON TEMPTATION AND CONFIDENCE
WEIGHT IN KILOGRAMS
170
160
150
140
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120
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100
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100
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80
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60
1
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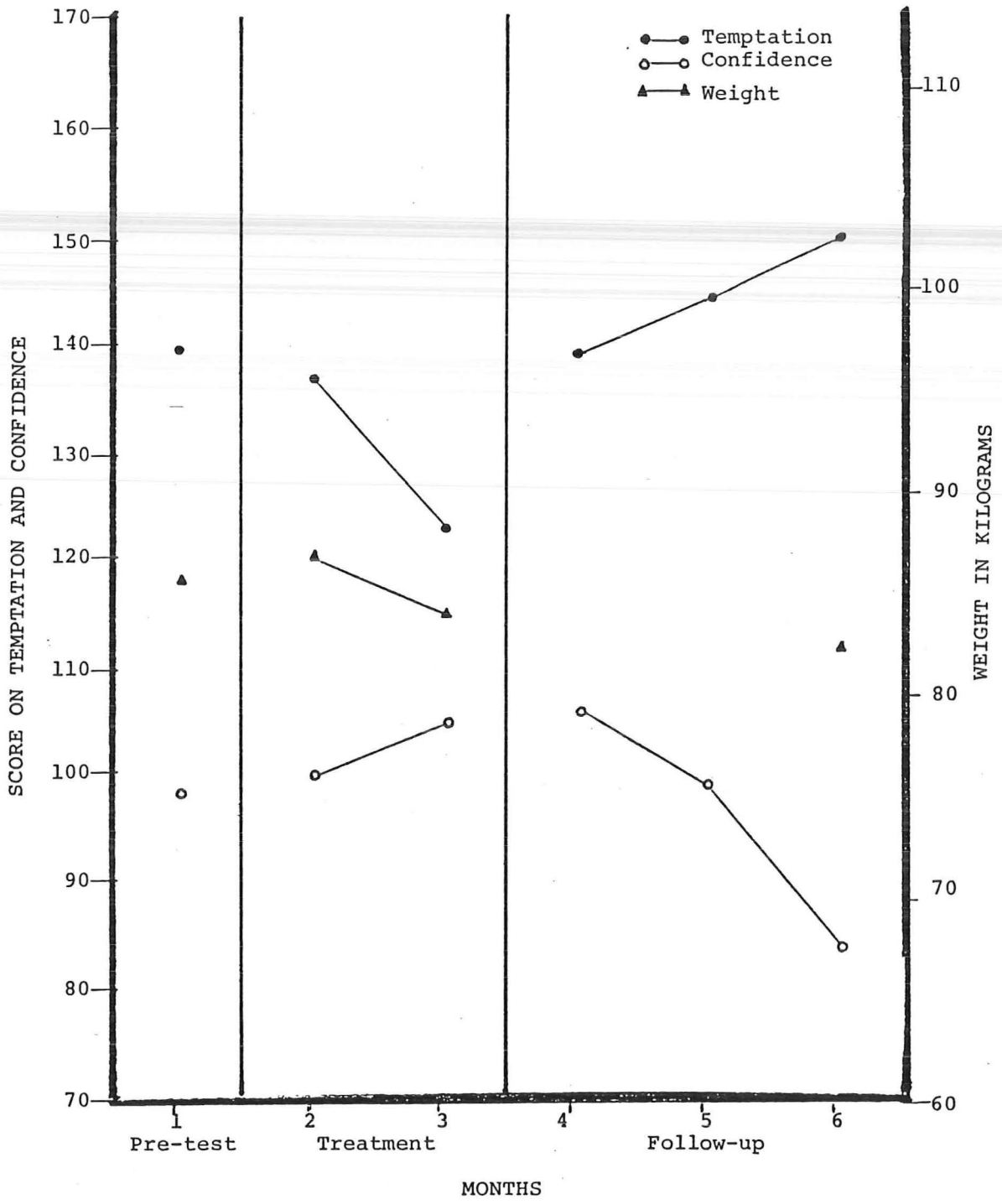
4
5
6
Pre-test
Treatment
Follow-up
MONTHS

FIGURE 4

Temptation, confidence and weight for subject 4

FIGURE 4.


Temptation
Confidence
Weight
SCORE ON TEMPTATION AND CONFIDENCE
WEIGHT IN KILOGRAMS
170
160
150
140
130
120
110
100
90
80
70
110
100
90
80
70
60
1
2
3
4
5
6
Pre-test
Treatment
Follow-up
MONTHS

SUBJECT 5

In looking at the scores over time for subject 5 (refer appendix 17) temptation was mostly low and confidence mainly high. The two low points in confidence resulted in minimal weight loss compared with other occasions.

See figure (5) It is clear for this subject that as temptation and confidence dropped weight was gained. When both temptation and confidence rose the subject continued to lose weight.

SUBJECT 6

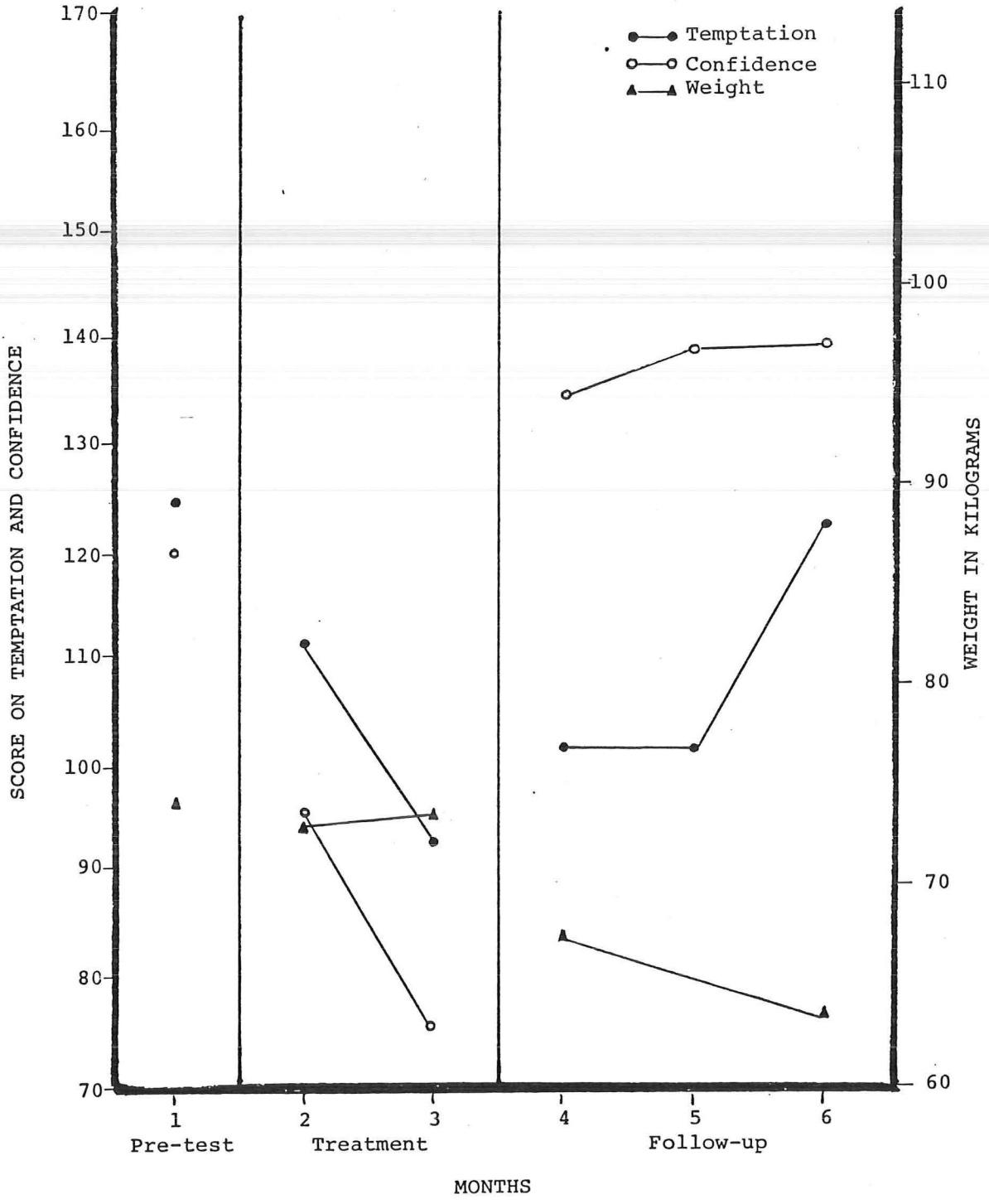
In looking at the scores over time for subject 6 (refer appendix 17) temptation was consistently high and confidence low. Low confidence matched low weight loss overall.

See figure (6) Confidence can be seen to be low throughout and temptation high. Weight loss is minimal.

FIGURE 5

Temptation, confidence and weight for subject 5

FIGURE 5


Temptation
Confidence
Weight
SCORE ON TEMPTATION AND CONFIDENCE
WEIGHT IN KILOGRAMS
170
160
150
140
130
120
110
100
90
80
70
110
100
90
80
70
60
1
2
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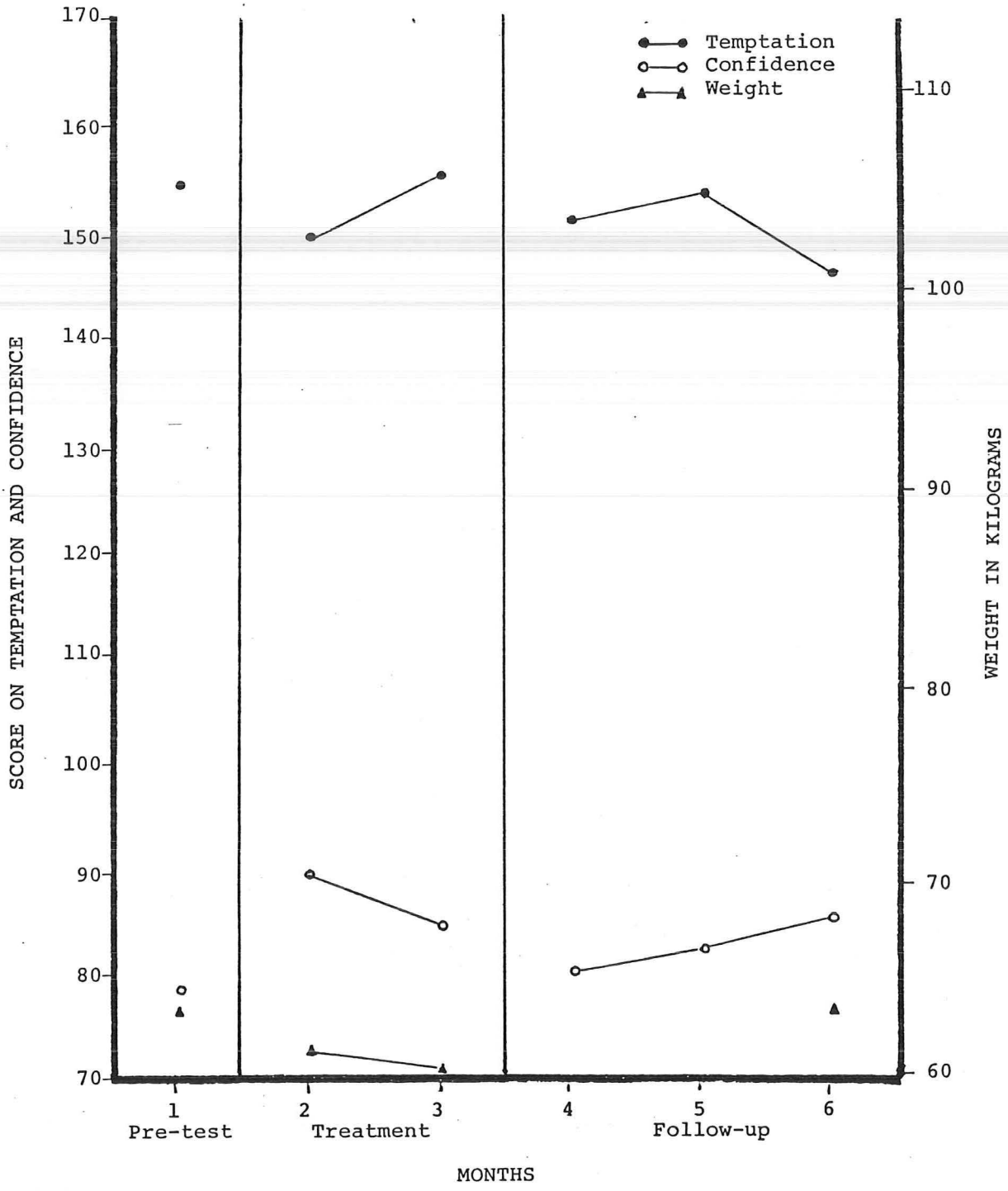
4
5
6
Pre-test
Treatment
Follow-up
MONTHS

FIGURE 6

Temptation, confidence and weight for subject 6

FIGURE 6.


Temptation
Confidence
Weight
SCORE ON TEMPTATION AND CONFIDENCE
WEIGHT IN KILOGRAMS
170
160
150
140
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120
110
100
90
80
70
110
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70
60
1
Pre-test
2
3
Treatment
4
5
6
Follow-up
MONTHS

SUBJECT 7

Both temptation and confidence were high most of the time, but weight loss was low. Looking at the scores over time for subject 7 (refer appendix 17) temptation appears to be too high in relation to the confidence scores even though confidence was high. Actual confidence may have been overestimated by this person.

See figure (7)

SUBJECT 8

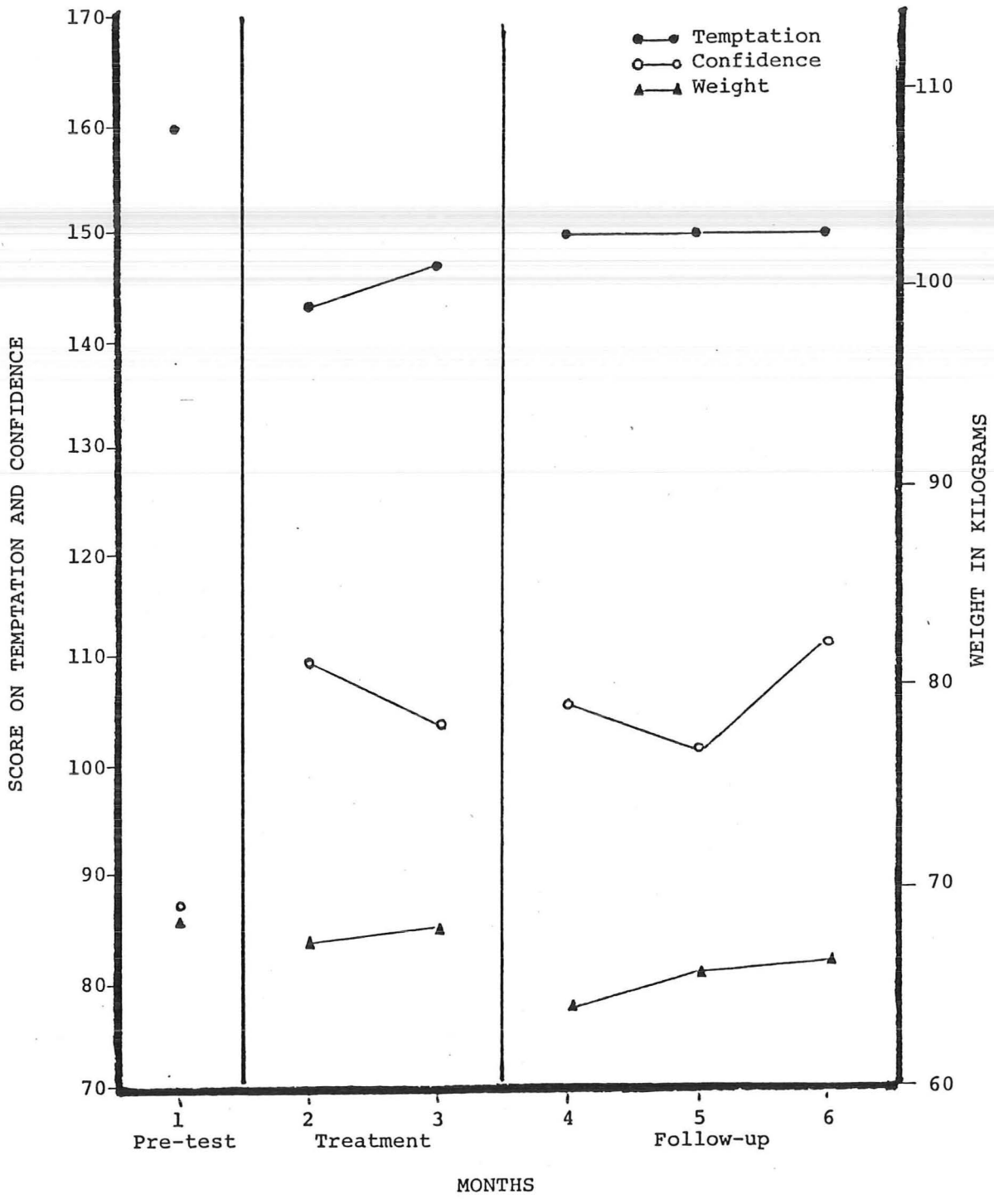
In looking at the scores over time for subject 8 (refer appendix 17) consistently high confidence and high temptation match high weight loss throughout.

See figure (8)

FIGURE 7

Temptation,confidence and weight for subject 7

FIGURE 7.


Temptation
Confidence
Weight
170
160
150
140
130
120
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90
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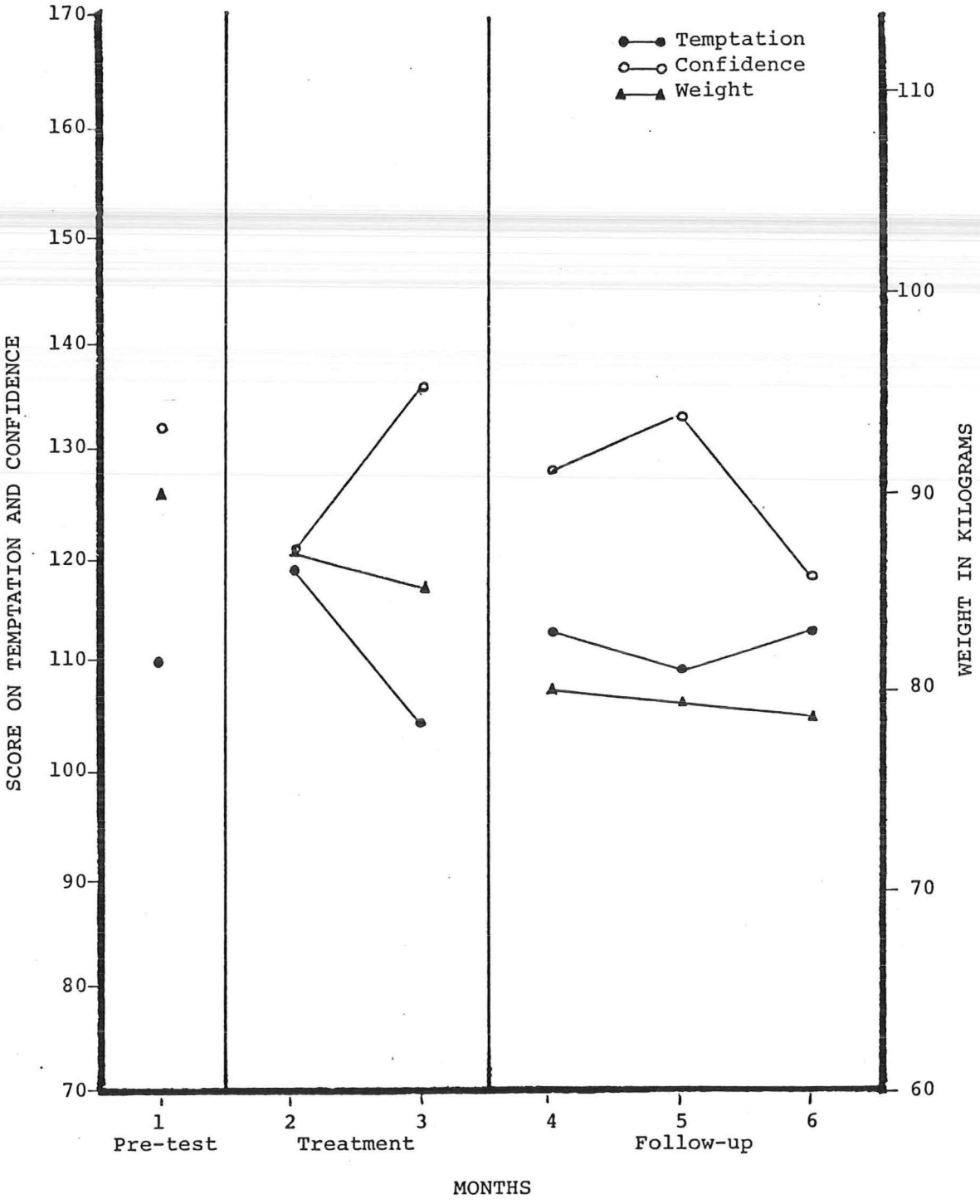
70
110
100
90
80
70
60
SCORE ON TEMPTATION AND CONFIDENCE
WEIGHT IN KILOGRAMS
1
Pre-test
2
3
Treatment
4
5
6
Follow-up
MONTHS

FIGURE 8

Temptation, confidence and weight for subject 8

FIGURE 8


Temptation
Confidence
Weight
SCORE ON TEMPTATION AND CONFIDENCE
WEIGHT IN KILOGRAMS
170
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120
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100
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Pre-test
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Treatment
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6
Follow-up
MONTHS

SUBJECT 9

In looking at the scores over time for subject 9 (refer appendix 17) data points 3,4,5 & 6 show drops in confidence. Following these points weight is gained or maintained but not lost.

See figure (9) When confidence is low and temptation high (data point 3) weight started to be gained.

SUBJECT 10

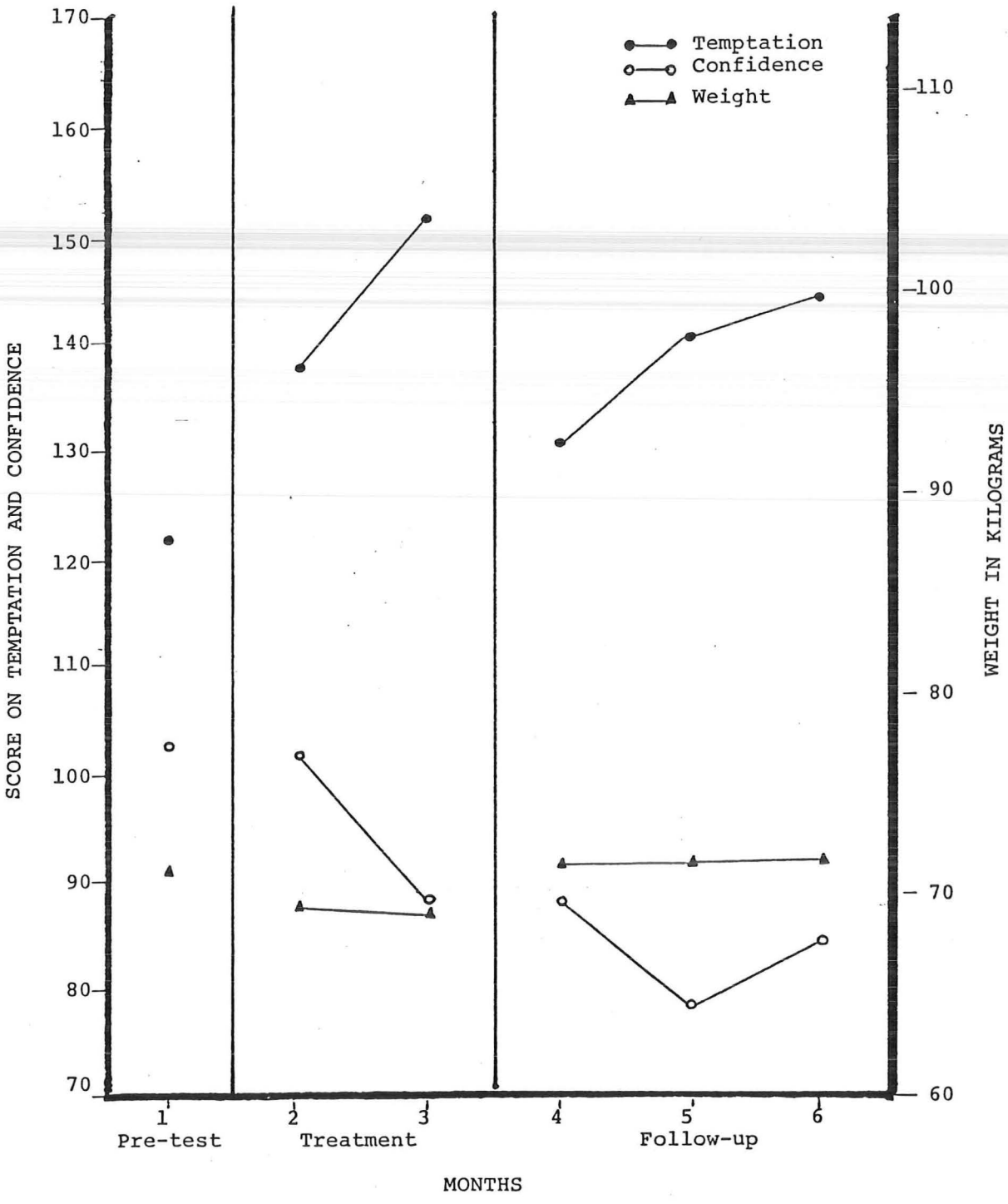
In looking at the scores over time for subject 10 (refer appendix 17) temptation was high throughout and confidence mostly low. Weight loss is minimal when it occurs and gains also appear. Overall weight loss is low. Confidence was not high enough to counteract temptation.

See figure (10)

FIGURE 9

Temptation, confidence and weight for subject 9

FIGURE 9.


Temptation
Confidence
Weight
SCORE ON TEMPTATION AND CONFIDENCE
WEIGHT IN KILOGRAMS
170
160
150
140
130
120
110
100
90
80
70
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100
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80
70
60
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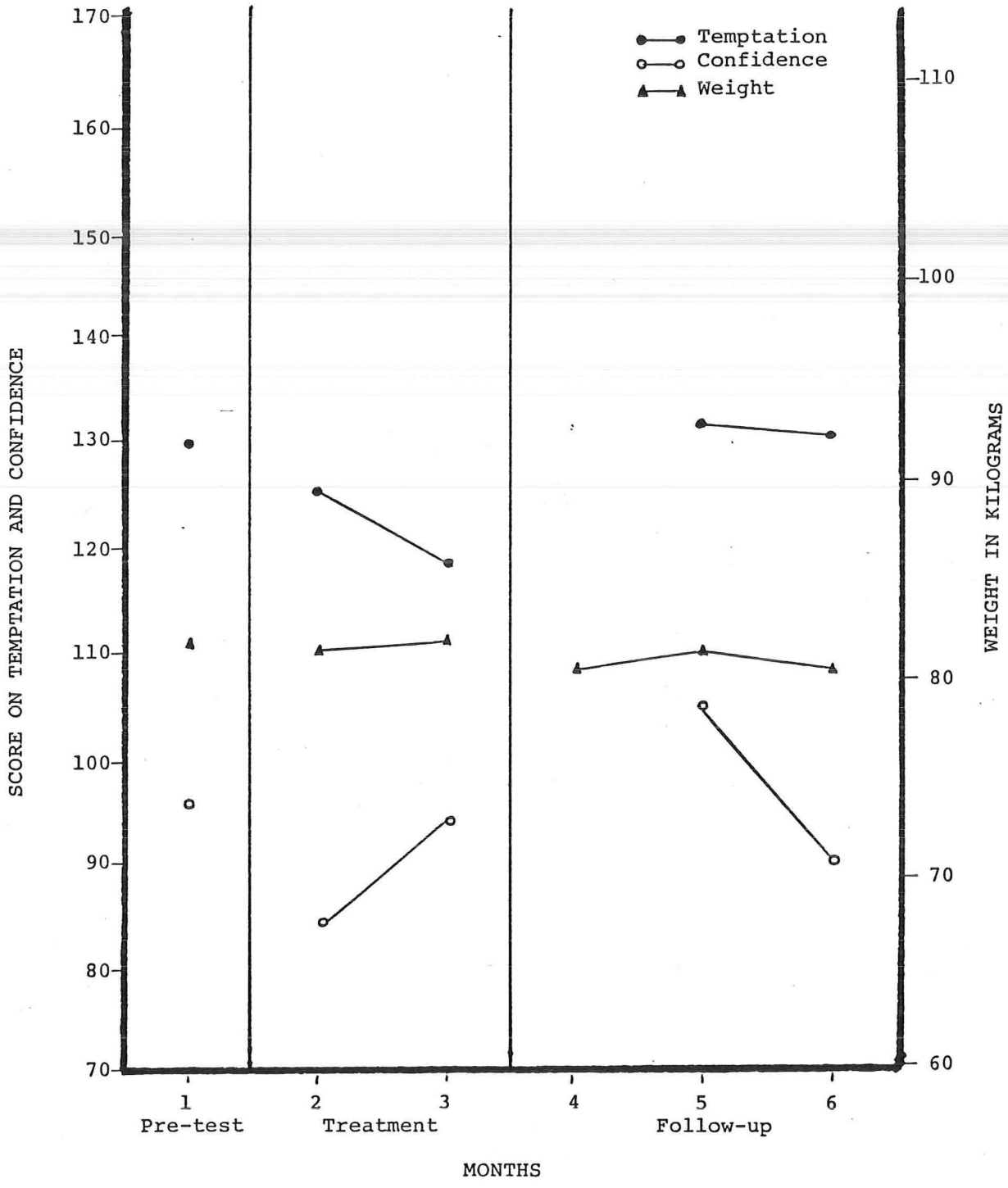
6
Pre-test
Treatment
Follow-up
MONTHS

FIGURE 10

Temptation, confidence and weight for subject 10

FIGURE 10.


Temptation
Confidence
Weight
SCORE ON TEMPTATION AND CONFIDENCE
WEIGHT IN KILOGRAMS
170
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140
130
120
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Pre-test
Treatment
Follow-up
MONTHS

SUBJECT 11

In looking at scores over time for subject 11 (refer appendix 17) data points 4 & 5 are low in confidence. At these points weight is maintained or gained.

See figure (11)

SUBJECT 12

In looking at scores over time for subject 12 (refer appendix 17) Confidence is consistently low and temptation mostly high. Weight is either gained or maintained for this subject.

See figure (12)

FIGURE 11

Temptation, confidence and weight for subject 11

FIGURE 11.

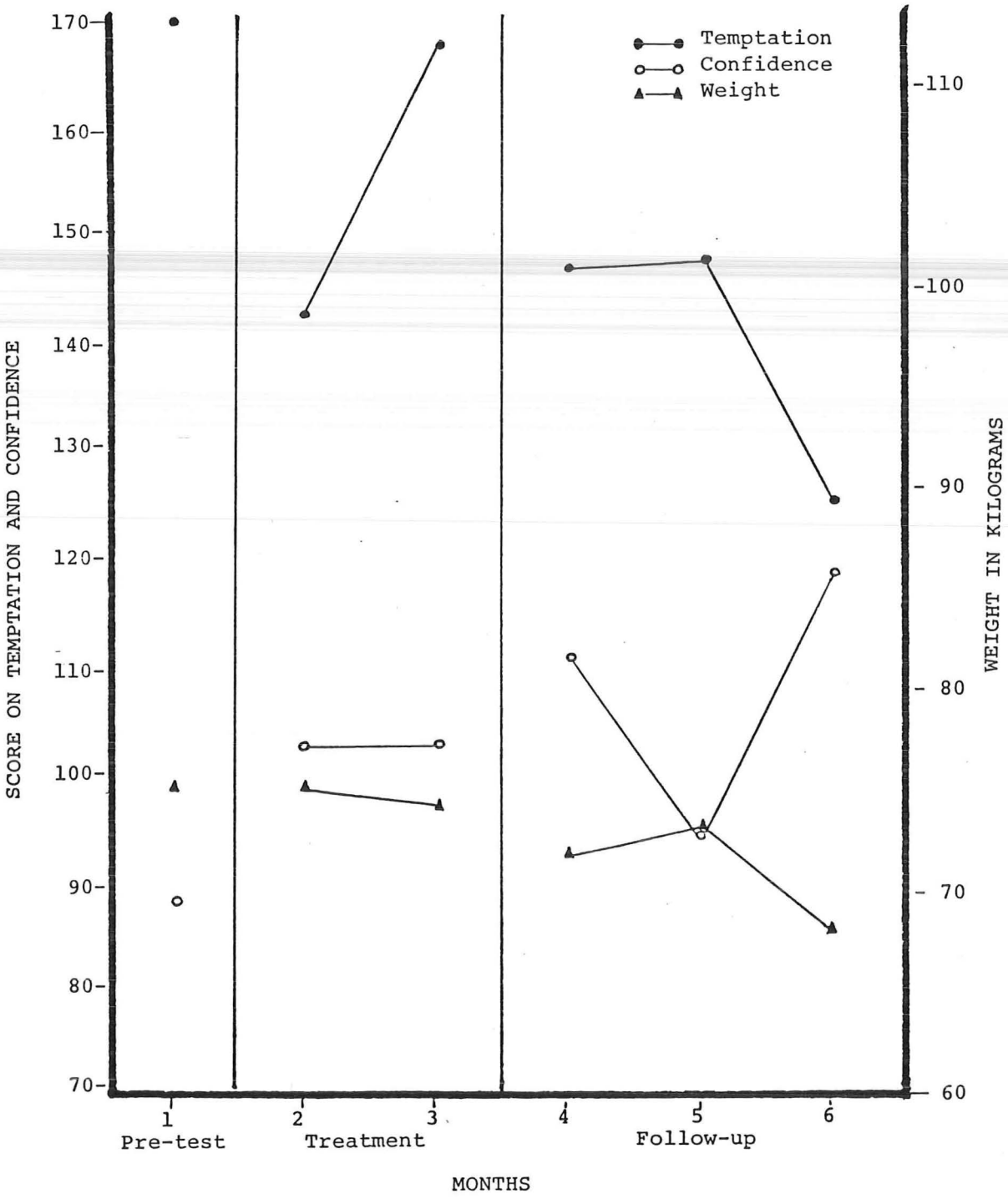
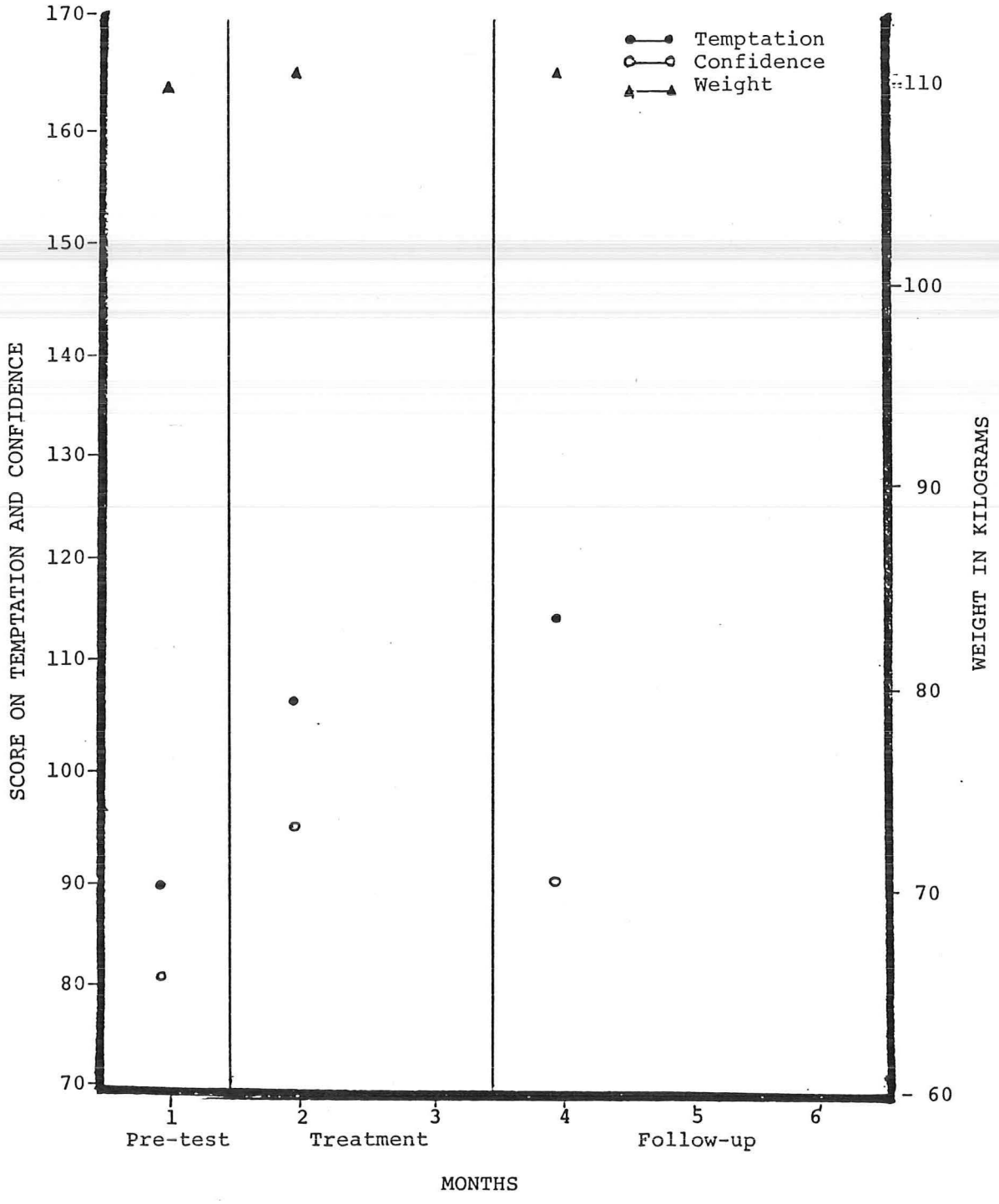

Temptation
Confidence
Weight
170
160
150
140
130
120
110
100
90
80
70
-110
-100
- 90
- 80
- 70
60
SCORE ON TEMPTATION AND CONFIDENCE
WEIGHT IN KILOGRAMS
1
2
3
4
5
6
Pre-test
Treatment
Follow-up
MONTHS

FIGURE 12

Temptation, confidence and weight for subject 12

FIGURE 12.


Temptation
Confidence
Weight
170
160
150
140
130
120
110
100
90
80
70
SCORE ON TEMPTATION AND CONFIDENCE
110
100
90
80
70
60
WEIGHT IN KILOGRAMS
1
2
3
4
5
6
Pre-test
Treatment
Follow-up
MONTHS